

FOREST, FIELD AND FACTORY:
CHANGING LIVELIHOOD STRATEGIES IN TWO EXTRACTIVE RESERVES IN
THE BRAZILIAN AMAZON

By

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This study examines socioeconomic changes in Acre, the westernmost state in the Brazilian Amazon. In the southeastern municipality of Xapuri, extractive producers have created and sustained a socio-political movement that has resulted in a new model of communal land management called extractive reserves. Extractive reserves are federal tracts of forested land that have been designed to provide an alternative to Amazon development policy by securing the usufruct rights of forest residents to remain in protected areas and to continue practicing traditional, nondegradatory livelihoods.

This study explores the impacts of a project within two extractive reserves that was designed to generate rural employment and add value to Brazil nuts, a traditional product harvested from the forest. Through post-harvest processing (shelling and drying) of the nuts

in the extractive reserves, the project sought to increase the income levels of forest dwellers, thus stabilizing the rural population by improving the general economic well-being of extractive reserve residents.

Using a political ecology framework, I examine this social movement, the extractive reserves and the Brazil nut project in order to determine their ability to secure sustainable livelihood strategies for traditional forest dwellers. I argue that such transformations of local economies and the construction of new forms of community in the reserves combine with Acre's unique history, ecology and socio-political conditions and force us to rethink the abstract inevitability of proletarianization of the peasantry on an expanding capitalist frontier and the relegation of small producers to subsistence-level production.

CHAPTER 1

THE POLITICAL ECOLOGY OF EXTRACTIVE RESERVES IN SOUTHEASTERN ACRE, BRAZIL

This study examines socioeconomic changes in Acre, the westernmost state in the Brazilian Amazon. In the southeastern municipality of Xapuri, extractive producers have created and sustained for over two decades a socio-political movement that has resulted in a new model of communal land management called extractive reserves. Extractive reserves are federal tracts of forested land that have been designed to provide an alternative to Amazon development policy by securing the usufruct rights of forest residents to remain in protected areas and to continue practicing traditional, nondegradatory livelihoods.

With the demarcation of the reserves, these small-scale commodity producers have been able to maintain their autonomy and effective control of their land in the face of rapid capitalist expansion. Their experience differs from that of producers in the eastern Amazon, where it has been argued that the expanding frontier and capitalist penetration results in a general transformation from autonomous peasant producers to a proletarianized work force (Foweraker 1981). The culturally and historically unique character of these Amazonian peasants, or *caboclos* (Nugent 1993), in large part determines the ongoing transformation of their traditional extractive economies into a new, distinct "house model" (Gudeman and Rivera 1990) within the reserves. Using a political ecology framework, I argue that such

transformations of local economies and the construction of new forms of community in the reserves combine with Acre's unique history, ecology and socio-political conditions and force us to rethink the supposed inevitability of proletarianization of the peasantry on an expanding capitalist frontier.

This study centers on the transformation of economies and the continuing emergence of communities in the extractive reserves. One alternative production strategy, the post-harvest processing of Brazil nuts, is examined in light of these change processes. Research questions focus on the impact of this Brazil nut project in conjunction with other organizational and economic shifts in the reserves and in the social movement of local producers. How does the project affect income levels of the households and individuals involved? How is this income distributed within the household and how are decision-making strategies changing? Are gender roles in the household and in the community changing because of the project? What other shifts in productive activities and gender roles are taking place? What are the implications of these changes for the future viability of the reserves in this study? These questions are addressed within a political ecology framework which contextualizes the Xapuri rubber tappers' movement in the historically specific experience of Acre as the westernmost state in the Brazilian Amazon.

Extractive Reserves and the Movement in Xapuri

The rubber tappers' movement in Xapuri and the eventual establishment of the extractive reserves was a response to the federal government's Amazon development policy of the 1970s and 1980s. Federal and state governments promoted the expansion of capital-

intensive agricultural enterprises in the Amazon, most of which consisted of cattle ranches that enjoyed significant benefits in the form of tax write-offs and reduced-interest financing and which required clearing of large tracts of forest (Browder 1986, 1988; Hecht 1982; Schmink and Wood 1992). Although there were fewer subsidies awarded for these activities in Acre than in the eastern part of the basin, many rubber tapper families were expelled from the forest as ranchers claimed the old rubber estates, or *seringais*. Some families fled to Bolivia, where they continued to tap rubber, while others took up residence on the periphery of Rio Branco, the capital of Acre.

While the BR-364 highway was being paved through the neighboring state of Rondônia on its way to Acre, bringing widescale deforestation and social conflict, the rubber tappers in Xapuri organized themselves to defend the forest and secure their livelihoods. The movement was led by Chico Mendes, a rubber tapper and president of the rural workers' union who was assassinated by a local ranching family in 1988. Chico Mendes did not oppose construction of the road, but he organized the rubber tappers to protect their claim to forested areas that lay within the area affected by the BR-364.¹

The rubber tappers' most effective tool in defense of the forest was the *empate*. In these demonstrations in the forest, women, men and children would gather at the site of a forest clearing. Unarmed, they approached the ranchers' hired laborers, encouraging them to stop the deforestation by appealing to class interests. The ranchers responded with increasingly violent measures through their alliances with local police. The rubber tappers

¹ See IBGE (1990); Schmink and Wood (1992, p.114-117) for more on this road, affected areas and related projects.

were often met by armed police who had been called to the area (Allegretti 1990, 1994; Schwartzman 1989). In crucial *empates* women and children formed the front line of defense, placing themselves between the forest and the ranchers' chain saws (Campbell forthcoming).

In their struggle for social justice, the rubber tappers sought to avoid eviction and defend their livelihood.² Together they shared a common goal with national and international environmentalists -- that of saving the Amazon rainforest. Alliances with key individuals and organizations in the environmental arena strengthened the Xapuri movement (Keck 1995, Schmink and Wood 1992). With assistance from various non-governmental organizations and prominent supporters, the Xapuri rubber tappers worked together with extractive producers throughout the Amazon basin to hold a national meeting in 1985 in Brasília. During that meeting, they created the National Rubber Tappers' Council (CNS) and put forth the proposal to create a new type of land reform, extractive reserves (Allegretti 1990, 1994).

The rubber tappers' movement in Xapuri achieved major victories with the establishment of the first extractive settlements in 1987 and the later creation of extractive reserves in 1990. The role of the state in creating the extractive settlements and reserves was somewhat akin to the policy of "crisis colonization" carried out in the eastern Amazon (Schmink and Wood 1992, p. 172). In the extractive case, some areas were declared settlements or reserves in order to diffuse conflict between rubber tappers and ranchers. In others, the state used areas that were indemnified and slated to become colonization projects,

² See Juan Martinez-Alier and Thrupp (1992); Joan Martinez-Alier (1991); Schwartzman (1991, 1992b) on parallels between this and other social movements and ecology.

irrespective of the rubber tappers' movement identification of areas that it considered to be priorities for extractive reserves. This led to accusations on the part of the movement that the government created reserves in areas that were not unionized, knowing that the extractive reserve model most likely would not work well there, with the intention of discrediting the movement and the concept of the extractive reserves.³

The concept of the extractive reserves is based loosely on that of indigenous reserves, in which traditional peoples are guaranteed usufruct rights on federally protected land. The reserves are an alternative to other development initiatives at the federal level because they grew out of a grass-roots movement, were based on collective use and did not require division of the land into smaller, individual plots. The reserves are federal property under the jurisdiction of IBAMA, the federal agency for natural resource management. The outer boundaries of the reserves are demarcated, but the area within the reserve is common property to be managed collectively by an association comprised of all residents.⁴ Each household signs a 20-year contract with the federal government, agreeing to abide by the management plan of the reserve in which the rules and regulations for resource management are defined. Households within the reserve are responsible for management of their own forest tract, the boundaries of which are not demarcated but which are respected through traditional use claims.

³ See Allegretti (1994, 1995); Gomes and Felipe (1994) for a discussion of federal extractive reserve policy.

⁴ See Silberling (1992) for a discussion of the common property aspects of the extractive reserves.

The defense of the forest via the extractive reserves was only one priority for the movement in Xapuri. The movement also sought to protect and improve the lives of the forest-dwelling rubber tappers by establishing political and economic autonomy. Through the creation of a rural workers union, construction of schools and health posts, and establishment of the region's first agro-extractive cooperative, the movement has been able to realize significant changes for the lives of some of its participants (Allegretti 1990, 1994; Campbell 1990; Schwartzman 1989). Families in the area served by the union and the cooperative are now autonomous in that they can sell their products freely to the cooperative or to other traders. These families are thereby released from the conditions of debt-peonage resulting from the patron-client system which was established during the nineteenth century rubber boom in Amazonia. These victories are even more significant because of the very low levels of literacy, the sheer physical distances between families in the reserves and their isolation from urban markets.

During a seminar held by the CNS in Rio Branco in December, 1992, participants discussed directives for extractive reserve programs geared to address these challenges of marketing and social services. They emphasized that the original concept of the extractive reserve model was to preserve the way of life of agroextractive populations and to protect the forests in which they lived from conversion to pasture (CNS 1992a). In this study I examine the reserve model in light of an alternative technological innovation which has been recently introduced into the reserves in southeastern Acre. The incorporation of this production practice represents the ongoing process of constructing the extractive reserves. The participants in the 1992 conference highlighted the importance of this process.

The praxis of the reserves is changing rapidly in response to the problems encountered in current forest resource systems. We find ourselves at a critical juncture in the development of various potential extractive systems, based on current practices. Thus the extractive reserve is a relatively new proposal that is defining itself as problems are understood and as strategies surface which could resolve them. . . . The development of viable extractive reserves is a long-term process and will not simply result automatically from demarcation of the reserves. (CNS 1992a)

Using a political ecology framework, I examine the impact of one such strategy on the construction of new forms of social organization and the transformation of household economies in two reserves in southeastern Acre. This strategy is the decentralized post-harvest processing of Brazil nuts. By linking small, community and household-level processing facilities in the extractive reserves with the central factory located in the city of Xapuri, the cooperative has devised a modified extractive system which increases productivity and generates employment in the reserves without putting additional pressure on the resource base. The mechanics of the project are presented in Chapter 3. The remainder of this chapter is devoted to contextualizing this production alternative in the broader political ecology of the extractive reserves.

Political Ecology of the Extractive Reserves

Political ecology links an ecologically grounded social science approach within a political economy framework by focusing on the relationships between people, natural resources and the surrounding socio-political structures. In applying an analytical framework of political ecology to the extractive reserves in southeastern Acre, I address several new

directions within the specific context of frontier development.⁵ In the following sections, I examine the refinement of political economy in relation to social change, especially in frontier areas.

Peet and Watts point out that one of the innovative areas of inquiry within political ecology has to do with refinements to the concepts and application of political economy (Peet and Watts 1993). They criticize earlier political ecology authors, such as Blaikie and Brooksfeld (1987), for being too all-encompassing in their treatment of the world economy and for taking an almost voluntaristic stance on social factors and causes. The same criticism has been made of broader applications of political economy, although not necessarily within the political ecology framework. For example, William Roseberry notes that the related political and economic questions that became known as the agrarian question (having to do with the fate and revolutionary potential of the peasantry in the face of expanding capitalism) were, at one level, largely political questions to which largely economic answers were given. A focus on class-based issues led to a very poor understanding of the various political leanings and actions of peasants (Roseberry 1993). Sherry Ortner also argues that political economists are too economic and materialist in their approach, assuming that the capitalist system is ever-pervasive and that, therefore, anthropologists must recognize that our fieldwork is shaped by this system (Ortner 1984). This capitalist-centered world view of political economy can prevent its practitioners from truly knowing the full richness and variety of human experiences in relation to nature, especially as people's "ethnoscapes" (Appadurai

⁵ See Peet and Watts (1993) for a review of political ecology and new areas of inquiry in the field, including the refinement of political economy.

1991) and "imagined communities" (Benedict Anderson 1991) are broadened far beyond the physical limits of their geographical context. Particularly in the Amazon basin, peasant or *caboclo* production systems have been characterized as static and undifferentiated, when in fact just the opposite is true (Nugent 1993).

The presumed predominance of the capitalist system is increasingly challenged as researchers explore the variety of economic trends and livelihood strategies in which people are engaged (Chibnik 1994; Deere 1990; García Canclini 1993; Guha 1989; Lockwood 1993; Nugent 1993; Reed 1995; Schmink and Wood 1992; Sorensen 1988; Wilk 1991). Agricultural smallholders in various parts of the world (Netting 1993) and in various agroecosystems (Altieri 1990) have devised livelihood strategies by which they resist proletarianization and retain control of their land through subsistence and market.

In order to strengthen the link between society and nature in political economy studies, William Roseberry calls for a materialism that explores the culture and consciousness of a certain population (Roseberry 1989). In the same vein, David Cleary's analysis of the Amazon calls for "a reconstructed political economy [which] should begin with the region and work outwards" (Cleary 1993, p. 338). This approach is taken in this study by working from the experiences of the rubber tappers in Xapuri who based their resistance and social movement on the defense of their nature-society relationship (Joan Martinez-Alier 1991; Juan Martinez-Alier and Thrupp 1992).

Classic Marxist political economy predicts that, with the development of full-scale, capitalist agriculture, the peasantry will become increasingly articulated within the capitalist system and will differentiate into either rural bourgeoisie (commodity producers in

agriculture) or rural proletariats (rural wage workers). Thus, peasants or small commodity producers eventually disappear with the development of capitalism because they constitute a transitory part of a social class (de Janvry 1981). However, the penetration of capitalism into agriculture varies widely and the transitions from one mode of production to another are not distinct, such that there may be multiple modes of production in existence at the same time, particularly in frontier zones (Wood 1982). Thus, in the transition towards capitalism, it is possible that small producers will be neither true proletariats or true peasants but rather "semi-proletarians" (de Janvry 1981), reliant upon a combination of subsistence and commodity production which may include wage labor.

Does this line of reasoning apply in frontier situations? The application of the political economy model to the expansion of the frontier in Amazonia has been instrumental in explaining social change as the capitalist market system penetrates the hinterland (Foweraker 1981). However, Ortner's criticism of the strongly economistic concentration of the political economy model (Ortner 1984) is affirmed by several reviewers of Foweraker's theory who note that it is difficult to apply this abstract framework to a variety of complex social and political relationships (Cleary 1991; Dean 1984; Schmink and Wood 1987). Regional variation within the basin calls for closer attention to differences within the peasantry (Nugent 1993), urbanization (Becker 1995), social activism and different frontier dynamics (Bakx 1988; Cleary 1991, 1993; Hay 1988; Martins 1990; Rudel and Horowitz 1993; Schmink and Wood 1992).

I argue that the dynamics of social change, state policy and economic development on the Amazon frontier call for modification to traditional political economy, in particular its

transhistorical, evolutionary stages of development and social labels of "peasant," "proletariat" and "capitalist." I agree with David Cleary who argues that it is crucial to recognize the difference between capitalization and monetization of the economy in the Amazon frontier. This incomplete penetration of the region by capitalism results in a complex environment in which the outcome of migration, urbanization and proletarianization trends fail to fit the empirical predictions of traditional political economy. Cleary thus calls for a modified political economy which takes into account the importance of the informal economy, various forms of human agency, the changing role of the state and the diversity of livelihood strategies in which frontier populations are engaged (Cleary 1993).

In moving away from traditional models of capitalism which apply evolutionary or linear stages of development such as "pre-capitalist" or "capitalist" in the Amazon basin (Foweraker 1981; Hay 1988), Charles Wood encourages a political economy approach which allows for the recognition of various modes of production in a particular area at the same time (Wood 1982). Cleary concurs in arguing that the complexity of changes and processes in the Amazon make use of political economy's hegemonic, evolutionary model of noncapitalist-precapitalist-capitalist stages obsolete.

Questioning the assumption of pervasive capitalist penetration is essential in order to recognize the variety of economic trends and livelihood strategies being practiced throughout the region, strategies that call into question the use of terms that have become somewhat vague such as "peasant" (Cleary 1993), "small farmer," or "cattle rancher" (Browder 1995a). Stephen Nugent calls for a closer examination of the Amazonian peasant *caboclo*, a social category whose cultural and economic distinctiveness is often overlooked (Nugent 1993).

I have chosen to use here the term which people in the two research communities use to describe themselves; rubber tapper or *seringueiro*.⁶

This refinement of political economy requires that anthropologists carry out household studies that build on Chayanovian economic analysis (Roseberry 1993). Within the extractive reserves, I argue that these producer households do seek to balance the need to balance cash and subsistence requirements. Through new production alternatives, households and communities are investing their labor, working capital and future earnings to build autonomous processing facilities through which they add value to a traditional extracted forest product. Households and individuals intend to use the increased cash income from such enterprises for the purchase of transport animals, cattle, urban schooling for their children, improved housing, and infrastructural improvements on their land. In Chapters 3 and 4, I will show that rubber tapper households are not economically stagnant, as Nugent has argued for *caboclo* economies in general (Nugent 1993). Reserve residents are actively participating in defining new livelihood strategies as the extractive reserve model is constructed.

These new livelihood strategies bring about significant changes in gender roles, the division of labor and the allocation of resources within rubber tapper households. As will be seen in this study, changing market values for forest products (Leach 1994) has implications for the gendered social spaces and resources to which different household members have access (Rocheleau 1988; Rocheleau et al. 1995). With the introduction of wage labor in the

⁶ For a gendered discussion on the female equivalent of this term, see Campbell 1996. For discussion of the Amazon *caboclo*, see Nugent 1993; Parker 1985.

processing units, rubber tapper households are following a pattern noted by Carmen Diana Deere who recognizes that households are often the site of multiple class interests with important and varied gendered roles (Deere 1990; Deere et al. 1995). These shifting roles in the household call for attention to intra-household cooperation and conflict (Sen 1990). As Deere has argued in her analysis of peasants in Peru, the producers in this study have been able to resist full proletarianization and escape from poverty by employing a multitude of income-generating activities in a gendered division of labor. These household-level implications will be explored in Chapter 4.

Community-level shifts in social organization and economic relations are also taking place within the extractive reserves. Within these new economies, I argue that rubber tapper households are afforded the opportunity to make investments in post-harvest processing only because their communities are politically and socially mobilized. Thus, they have access to credit opportunities or external funds to finance start-up costs of production alternatives. These opportunities exist through the national and international alliances formed between the rubber tappers' social/ecological movement and environmental allies and donor agencies. These relationships, the opportunities and the roadblocks faced by the rubber tappers in Xapuri are due to the fact that the extractive reserves are a confluence of discourses, interests and actions on several levels. Each reserve will be different depending on the local discourse and practice and its relationships to other discourses and practices. The next section in this chapter brings in one such discourse and debate, which is the promotion of non-timber forest products as a "conservation" and "development" alternative for the extractive reserves.

Non-Timber Forest Products within the Political Ecology of the Extractive Reserves

The debate over the suitability of promoting non-timber forest products draws in several key issues within the political ecology framework. The viability of smallholder production, the danger of increased reliance on unstable markets, overexploitation of native forest stands and diverting attention from the structural issues of land tenure, state responsibility for market development and human rights are all hotly debated in relation to the marketing of non-timber forest products. In this study, I explore this debate in light of an ongoing project in the extractive reserves--the post-harvest processing of Brazil nuts.

This study focuses on a community-level project in the western Amazon which is at the confluence of the conservation-development debate. In defining alternatives to past development practices that resulted in widescale deforestation and severe social costs, local communities, municipal governments and donor agencies seek to meet developmental goals of increased household income and stabilized rural and urban-fringe populations, and conservation goals of decreasing pressure on Amazonian rainforests. One alternative that has been enthusiastically embraced by some researchers and rainforest communities is that of adding value locally to non-timber forest products (NTFPs) that are either gathered from the forest or cultivated in agroforestry plots.

The marketing of NTFPs through the so-called "rainforest harvest" is a development initiative that is intensely debated by its promoters and detractors in both the academic and popular literature. As pointed out by Anthony Anderson, the debate has become polarized to the point of obscuring objective analyses of extractivism as a development option (Anthony B. Anderson 1994). I agree with others who caution that the promotion of non-timber forest

products or other forest management practices could serve to draw attention and resources away from structural issues such as land tenure, human rights and the need for local communities to define their own alternatives to development (Corry 1993; Escobar 1995; Nugent 1991). However, it is important to note that the non-timber forest product examined in this study was initiated and carried out by a local cooperative of agro-extractive producers with technical assistance from an non-governmental organization. Also, the communities involved in this project have secure land tenure and an established cooperative marketing organization through which they market their production. Thus, they differ from other rainforest groups who may have become involved in other non-timber forest projects that paid less attention to such matters and focussed instead on marketing novel products.

In order to define common ground for this discussion on non-timber forest products, I present here Jefferson Fox's (1995:189) definition:

NTFPs are defined both by what they are and by how they are harvested. They encompass all biological materials that are extracted from natural forests for human use. These uses include foods, medicines, resins, latexes, dyes, fodder and fiber grasses, wildlife (products and live animals), fuelwood, rattan, bamboo, and smallwood. Methods of harvest include the collection of natural products from the forest and small-scale production of products that originally grew naturally. Thus the definition includes wood harvested for local use for housing, construction or export from the region of origin but not wood harvested by large-scale timber interests.

While this definition is fairly clear, the debate over whether management of these products can benefit local communities and conserve tropical forests over the long term is very murky. Adding to the complexity of the debate are the differences between cultivated and gathered non-timber forest products. Most of the literature to date on NTFPs has examined extracted products and attempted to determine the economic value of the forest,

without adding value to the products through post-harvest processing. Yet there are significant differences between cultivated and gathered products and between those products sold *en natura* and those to which value is added. The literature generally has examined NTFPs marketed by individuals. There are significant differences which must be examined between cases of cooperative marketing versus those of individual producers marketing NTFPs directly.

Those studies that have focused on socioeconomic issues have tended to concentrate on comparative income levels from NTFPs as opposed to other management strategies. Other key variables that must be examined in evaluating NTFPs as a conservation and development alternative include intra-household access to and control over certain resources, intra-household decision-making strategies, availability of labor for production and processing, social organization for production and marketing and changes in population settlement and urban migration due to the level of centralization in the production, processing and marketing stages. The implications of these variables for different genders and socioeconomic classes within participating households and communities are far reaching and profound. In the end, such implications could determine the performance and equity of projects which promote processing of non-timber forest products.

This study varies on two fronts from the majority of the NTFP literature. First, this study examines the socioeconomic impacts that result from post-harvest processing NTFPs. Second, this study focuses on gender issues at the household and community levels and examines the socioeconomic changes resulting from the introduction of post-harvest processing and cooperative marketing of non-timber forest products. These two points link

the NTFP debate back to issues within the political ecology framework that I raised earlier. In the construction of new economies in the extractive reserves in which autonomous producers are involved in communal management of forest resources, will processing initiatives significantly shift labor relations within the reserve due to an increase in wage labor? Households that invest in autonomous processing enterprises may be better able to resist proletarianization than others. As market values shift for certain products, will some households or individuals benefit unevenly because of *a priori* differences in resource access and control? As will be seen in Chapters 3 and 4, household production and resource management strategies in the extractive reserve are quite varied. Thus, households and individuals define different relationships with particular resources and post-harvest processing.

I argue along with other researchers that the collection, cultivation and marketing of NTFPs in extractive or agroforestry systems can be key sources of household income for gatherers and cultivators, providing certain conditions are met (Allegretti 1995; Anthony B. Anderson 1992; Anderson and Ioris 1992; Arguello 1995; Butler 1992; Clay 1992a, b; Clay and Clement 1993; Padoch and Denevan 1987; Padoch et al. 1985; Panayotou and Ashton 1992; Pinedo-Vasquez et al. 1992; Plotkin and Famolare 1992; Salafsky et al. 1993; Schwartzman 1992). In the case presented here, the marketing of NTFPs strengthens ethnic or community identity and socio-political cohesion, as others have found elsewhere (Clay 1992a; Nations 1992; Reed 1995).

Research Sites and Methods

This study examines the process of socioeconomic change in two extractive reserves in southeastern Acre related to the introduction of a new technology in post-harvest processing. The reserves in this study are the Cachoeira and Chico Mendes Extractive Reserves. The Chico Mendes reserve covers 976,570 hectares (Estado do Acre 1991) and has a population of 3000-4000 families (CNS et al. 1992). The *seringal* "Floresta" lies within this reserve and is one of the two areas in this study. The Cachoeira Extractive Reserve covers 24,473 hectares (Estado do Acre 1991). Population estimates range from 68 families (Estado do Acre 1991) to 80 families (CNS et al. 1992).

The NTFP project that is the focus of this study is the decentralized processing of Brazil nuts. In this project, nuts are harvested, shelled and dried in the extractive reserves before being brought to the central factory in the town of Xapuri for final packaging. The project consists of community and household-level processing units in the Floresta and Cachoeira extractive reserve areas. The project began in 1991 with the installation of three pilot sites, one each in Floresta and Cachoeira and a third in another area.

Within a political ecology framework, I focus on the farming systems of the producers in studying the relationship between the household division of labor, household budgets, decision-making, and access to and control of resources as well as community organization before and during the project activities. Field research began in September, 1991, and ran through December, 1994, with field trips of three to six months conducted each year.

I used four methodological techniques in this research project. I gathered maps and other information about the reserves and the communities from their representative

organizations to complement data I had previously obtained while conducting my master's research in some of the same *seringais* in Xapuri in 1988 and while working on a University of Florida agroforestry project from 1990 to 1991. Secondly, I conducted household-level interviews before and after project initiation. Third, I conducted individual and focus group interviews with those employed by the project in both sites. Lastly, I carried out semi-structured interviews with project personnel and organization leaders for project-level data and their evaluations of the project.

A stratified, random sample of households was used. Using a map of the Floresta *seringal* which depicts households, rivers, roads, schools and health posts, I divided the map into distinct geographical sections such that the various divisions encompass differences in physical access (proximity to roads and rivers) and services (schools, health posts, cooperative outposts). I randomly selected 48% of the households, or roughly 19 families, divided among these divisions relative to the population density. Accompanied by a community member, I traveled by foot within the *seringal*, conducting roughly one interview per day. A similar approach was followed in the Cachoeira reserve. Households in the reserve are anywhere from five minutes to two hours by foot on forest trails to the nearest neighbor. Within my sample, households were from two hours to a two-day walk from the city of Xapuri.

In the following chapter, I present the changing socioeconomic context of the extractive reserves in this study. I argue that the historical specificity of the reserves in Xapuri, the impact of the rubber boom in this area during the last century and the role of the state determine in part the community and household-level changes that are documented in

Chapters 3 and 4. Based on the historical framework of Chapter 2 and the trajectory of the rubber tappers' social movement, Chapter 3 focuses on a specific productive activity in the extractive reserves. The decentralized processing of Brazil nuts is contextualized within the extractive reserves and its socioeconomic impacts are examined within the reserve and the social movement in general. Chapter 4 explores the changing economies of households and individuals in the extractive reserves in light of the project intervention of decentralized Brazil nut processing. In this chapter, I argue that the traditional extractive economy of the reserve is being transformed and that households are becoming sites of multiple class relations and shifting gender roles as wage labor and post-harvest processing increase. Chapter 5 presents my conclusions and identifies research and organizational themes that deserve further attention.

CHAPTER 2 TRANSFORMING ECONOMIES AND SOCIAL ORGANIZATIONS IN THE EXTRACTIVE RESERVES

This chapter explores the ongoing implementation of two extractive reserves in southeastern Acre. Individuals, households and communities are transforming their economies from pure extractivism to more diversified strategies of production which include investments in "landesque capital" (Blaikie and Brookfield 1987). Economic changes go hand-in-hand with new and modified forms of social organization. Putting the extractive reserves into practice calls for new relationships between individuals, households and other social groups. Changing demands are put on producer organizations as the expectations of what the extractive reserve would bring conflict with the reality of serving a physically and organizationally dispersed population in remote and vast forest areas. In this chapter, I explore these transforming economies and social relations in light of the extractive reserves in this corner of the Brazilian Amazon.

The questions that I examine in this chapter reflect the dynamism of the extractive reserves. The reserves were not designed to be stagnant encapsulations of extractive practices and dyadic socioeconomic relations between producers and traders. What changes are occurring as result of extractive reserve implementation? How does the organization of

production in the extractive reserves differ from earlier forms of organization? What are the implications of these differences for the state and local economy and for household and individual economies? How have social relations changed over time and what are the impacts on resources use and social organization in the reserves? This chapter examines these questions within the larger framework of Acre's historic role in the rubber boom and the Amazon frontier as well as within the context of the rubber tappers' social movement in Xapuri.

Acre and Xapuri

In this first section I present geographic and socioeconomic data on the state of Acre and the municipality of Xapuri, where the extractive reserves of this study are located.⁷ This review places the extractive reserves and the changing economic and social character of the reserves' populations in the dynamic state and regional context of conflictive frontier processes of urbanization, environmental degradation and class formation.

The state of Acre is the westernmost state in Brazil and borders Peru and Bolivia. The state covers 152,589 km² and constitutes 3.07% of the Brazilian Amazon. The state lies between 7° N and 12° S while the capital city, Rio Branco lies at 9° S and at 160m in altitude (Estado do Acre 1991a). Acre's population totalled 417,718 in 1991, with 62% of the population living in urban areas (IBGE 1991). Average annual rainfall (measured in Rio

⁷ Acre has since created ten new municipalities, one of which, Epitaciolândia, includes the Cachoeira extractive reserve.

Branco) from 1988 to 1990 was 2230 mm and the average annual temperature was 24.7° C (Estado do Acre 1991a).

Acre has 88.24% of its territory in humid *terra firme* forest, 11.37% in *varzea* or seasonally inundated, lowland forest, and 0.39% in pasture or plains. The state's forests are rich in rubber (*Hevea brasiliensis*), castanha or Brazil nut (*Bertholettia excelsa*) and a great diversity of timber and non-timber forest species. The distribution of rubber is statewide, but Brazil nut is only found in the southeastern region of the state which is drained by the Purus river (IMAC 1991). As of 1991, 11.3% of the state was in extractive reserves, more than was dedicated to either indigenous reserves or colonization projects (Estado do Acre 1991a).

The soils of Acre are largely red-yellow podsols with some areas of cambisols and latosols. The rubber tapping communities in this study are in areas with podsols. These soils fall within the general classification of "normal," which indicates that they are good to normal for annual or perennial crops but not as well suited for pasture (IMAC 1991).

Acre's economy traditionally has relied on the extraction of valuable products from its forests. However, an industrial base that would add value to Acre's natural resources of rubber, Brazil nuts and timber has not been formed. A study of Acre's timber industry found that this sector was severely limited by weak business administrative skills, a lack of infrastructure such as all-weather roads and poor financing opportunities. Industry particularly was hindered by the lack of a forest sector policy. This, combined with the effects of regional development policy which favored expansion of agriculture and livestock, added to degradation of native forests and inhibited the practice of sound forest management (Governo do Estado do Acre 1986). As will be seen in Chapter 3, the same impediments to

industrial development have confronted the agro-extractive cooperative of Xapuri in its attempts to add value to Brazil nuts, one of Acre's valuable forest resources which could yield significantly higher returns to the region.

The lack of investment in Acre's primary resources and the state's emphasis on promoting agriculture and livestock are not reflected, however, in the state's tax base. The bulk of Acre's 1991 tax income (92%) came from commerce and service sectors while industry provided only 4% of the state's tax base. Of the remaining 4%, rubber, timber and Brazil nuts together constituted 2.2% of Acre's 1991 tax income, while agriculture and livestock jointly contributed only 1.9% (Estado do Acre 1991a).

The state's weak economic base is further reflected in Acre's reliance on federal subsidies and public salaries. A collaborative study by a state agency and a non-governmental organization examined Acre's state-generated income from 1968 to 1988. Acre's average annual income from the state's own economic sources (exclusive of federal grants and subsidies) over this 20-year period was only 12.4% of the whole state budget (CNS et al. 1992b). This trend has worsened, such that in 1991, only 9.8% of Acre's state finances originated from taxes on commerce and production. The remaining 90.2% of the state government's budget came from sources such as credit programs and transfer payments (Estado do Acre 1991a). Poor management of such transfer payments, largely due to corruption, result in a lack of investment in basic infrastructure such as adequate roads, marketing and communication services. Combined with high commercial taxes and expensive, mandatory social benefits, this hinders the establishment and operations of businesses that seek to add value to Acre's forest resource base (George 1996), such as those

of the cooperative in Xapuri . In order to contextualize this difficult economic environment, I conclude this section with a brief exploration of socioeconomic changes in Xapuri.

The municipality of Xapuri was founded in 1905 and covers 8,137km², or 5.3% of the state. The city of Xapuri lies at 10°S, at the confluence of the Xapuri and Acre rivers. Via overland routes, Xapuri lies 188 km from Rio Branco along the BR-317 road (Estado do Acre 1991a). In 1991, the municipality of Xapuri constituted 3.0% of Acre's population (IBGE 1991).

In 1980, federal census officials recorded the total population of Xapuri to be 14,692, with 79% (11,570) living in the urban area and 22% (3,122) living in rural areas (Estado do Acre 1991a). Acre's 1991 population data were based on surveys carried out by the National Health Service which has a reputation for tenacity in reaching all rural households. According to this survey, the total Xapuri population in 1991 was 14,803, with 26% of the population in urban areas and 74% in the rural areas (Estado do Acre 1991a), almost a complete inversion of the rural to urban ratio recorded in 1980 and one which would be counter to the growing trend of urbanization seen elsewhere throughout the basin (Becker 1995). The results from the 1991 federal census help to clarify these conflicting figures somewhat. In 1991, Xapuri's total population was 12,366 with 41% in the urban areas and 59% of the population in rural residences (IBGE 1991). I would argue that the rural population has been undercounted by the federal census and that the population trends in Xapuri are increasingly urban.⁸

⁸ Based on the number of domestic hook-ups with Eletroacre, the manager of the state's electric company facility in Xapuri suggested that the urban population in 1994 was in the range of 10,000 people.

During last century's rubber boom, Xapuri was an important trading post. Today, many of the storefronts of the trading houses along the river still bear the names of the Lebanese traders who came to Acre during the rubber boom. Rubber and Brazil nuts are still delivered by boat to the city of Xapuri and carried up the steep riverbanks to be sold in these trading houses. Due to the wealth generated in Xapuri during the boom, the city was well designed and retains some of the charm from the turn of the century, with brick-paved streets lined with towering mango trees, large parks and stately townhomes and stores.

However, as was the case throughout the basin, profits from rubber were not reinvested in production but were extracted from the region through the chain of merchant capitalism dominant at the time (Weinstein 1983). Today, Xapuri still relies on rubber and Brazil nuts for its income, although the greatest source of income for the municipality comes from the federal government in the form of public salaries and grants. Xapuri's main streets are now full of deep ruts. The roads leading out to the many neighborhoods of clapboard houses that have risen up around the city are poorly maintained dirt paths that quickly turn muddy and almost impassable during the rainy season. Water and electricity are provided on a somewhat precarious schedule, relying on a diesel-powered plant.

As with the state, the economy of the municipality of Xapuri is also heavily dependent on transfer payments from federal or state sources. In 1991, such transfers constituted 97% of Xapuri's financial statement. Xapuri's tax base that year relied heavily on livestock and commercial services, which accounted for 29% and 45% of tax income, respectively. Rubber constituted 21% of Xapuri's tax income in 1991 while Brazil nuts and timber contributed 9.4% and 2.7%, respectively. There was no recorded tax income from the sale of agricultural

goods in 1991 (Estado do Acre 1991a). As of 1991, 53% of the state was in extractive reserves (Estado do Acre 1991a) which could serve as a source for additional income from forest products.

The Rubber Boom in Acre

The fabled richness of Acre's forests made the region a target for the rubber barons during the nineteenth century (Tocantins 1979). During the rubber boom, which lasted from the mid-1880s to the early 1920s, rubber barons or bosses recruited laborers into the Amazon to work as rubber tappers. Most rubber tappers came from the Brazilian Northeast, an area which experienced a crippling drought in 1877, thus leaving many farmers desperate for work and vulnerable to the tales of riches to be made in the Amazon.⁹ Many of the rubber tappers in this study are descendants of these *nordestinos* or Northeasterner.

At the outset of their journey to the Amazon, workers were advanced dry goods and their passage was covered by the boss, an initial debt from which many would never be free. The rubber tappers formed the lowest rung of the debt-peonage system known as *aviamento*, a vertical chain of merchants and middlemen linking the rubber tapper in the forest to the large shipping houses of Belém and Manaus. After an often long and tiring journey, rubber tappers arrived at a small port village and were supplied with enough dry goods for several months. They were then taken further upstream to the forest tract or *seringal* where they would tap rubber. They were shown how to cut trails in the forest to access the 300-500

⁹ See Weinstein (1983); Dean (1987); and Santos (1980) for complete histories of the Amazon rubber boom.

rubber trees they would tap. Once a rudimentary shelter was constructed and the tappers had the basic skills needed to provide the boss with a good harvest of rubber at the end of the season, they were left alone in the forest for months at a time. Many died from malaria, snake bites or other maladies.

The tales of easy riches to be gained in the forest for the rubber tappers proved to be false as the accounts were tallied up in the boss' book, always showing a debt owed to the boss. During the rubber boom (1850-1910), the *aviamento* system ensured that the bosses maintained effective control over the rubber tappers' labor. The rubber tapper was kept constantly in debt to the boss through the latter's manipulation of the accounting books and the exorbitant prices charged for dry goods in exchange for rubber. Rubber tappers were forced to purchase all of their dry goods through their boss and were prohibited from selling rubber to another buyer. Retribution for selling rubber to another boss was swift and violent; at times the offending rubber tapper was killed by tying balls of rubber around his neck and then setting them on fire. Thus, the boss maintained effective control over the rubber tappers through economic and non-economic means.¹⁰

Women were scarce in the *seringal* (Santos 1980), especially in the upper reaches of the Amazon basin (da Cunha 1986). Indigenous women and children were often kept in brutal slave conditions as prostitutes or rubber workers (Simonian 1995). The few non-indigenous women who did live in the *seringal* were the wives of the political and economic elites (Tocantins 1979).

¹⁰ For an excellent, first-hand account of life as a rubber tapper in Acre during the turn of the century, see Yungjohann (1989).

Those controlling the latex extraction industry preferred to recruit single males from northeastern Brazil as laborers. Very few rubber tappers brought, or were allowed to bring, their wives and families with them (Reis 1953). As one observer put it, "[T]he *seringueiro* [rubber tapper] was a machine to produce rubber. No women dared accompany him to the desolate forest. Women would be dangerous for social stability, . . . objects so rare would cause envy and result in covetous crimes of passion" (Tocantins 1979, p. 166).¹¹ Women's presence would also undermine the bosses' control; by contributing their labor and services in subsistence agriculture and health care they would decrease the rubber tapper's purchases of the bosses' dry goods and medicines (UNIFEM 1990).

Rubber tappers in more isolated regions such as Acre requested that their bosses supply them with women. In response, the large commercial trading houses in Belém and Manaus began sending women to the *seringal*. They were delivered in much the same way as dry goods and utensils -- at inflated prices which were charged on the *seringueiro's* account in the boss's store. In one instance, the Governor of the State of Amazonas ordered the Manaus police to round up 150 women from the city's brothels and cabarets. These women were then shipped to and distributed in the Acrean city of Cruzeiro do Sul (Reis 1953). One immigrant who arrived in Amazonas in 1942 recalled how his uncle had made his fortune by taking advantage of the scarcity of women and selling his five sisters to local men (Benchimol 1992).

¹¹ Ligia Simonian also notes that women were seen as the cause of high crime rates in the *seringal* (Simonian 1995).

In 1910, the Brazilian monopoly of the rubber market was broken when Malaysian rubber came on the market. As the price of rubber fell, so did the bosses' means of control over the rubber tappers. The *aviamento* system weakened to the point that the bosses were unable to get the credit and dry goods they needed to supply and control their labor force. The rubber tappers were thus allowed to hunt, fish and plant their own crops. In addition, rubber tappers often sent back home for their wives and families. Others married local women and began to raise families in the *seringal*.

This dramatically changed the rubber tapping production system. With the inclusion of female and child labor, the household was able to diversify its production for subsistence and marketing. Hunting, fishing, Brazil nut gathering and extraction of other forest products became part of the household economy. The household gained a certain degree of autonomy in decision-making regarding labor allocation and livelihood strategies. However, most tappers were still in the vestiges of the debt-peonage system with no marketing opportunities other than itinerant traders or patrons who still were able to maintain economic control of the rubber tapper household.

During World War II, Japanese forces cut off valuable supply routes for rubber from Malaysia, leaving the Allied forces to seek rubber from the Amazon for the war effort. With financial backing from the U.S., credit sources were created to rejuvenate many rubber estates that had been inactive and rubber bosses enjoyed a resurgence of power, subsidized by generous marketing assistance (Dean 1987; Santos 1980). Workers were recruited from the northeast of Brazil and were classified as soldiers or *soldados da borracha*.

With the decline in prices after the war, a similar process to what occurred after the rubber boom took place. Many of the former rubber bosses abandoned their *seringal*. Those bosses who did remain were able to keep the rubber tappers in debt by the practice of manipulating the books and prices in their favor. Other rubber tappers were left vulnerable to itinerant traders or *marreteiros* who served as a patron or boss (Dean 1987; Martinello 1988; Santos 1980). Many of the *soldados da borracha* stayed on in Acre and continue to live and work in the *seringal* (Martinello 1988).¹²

The Colocação: A Changing Socioeconomic Space in the Forest

During the days of the rubber boom in the last century, the forest tract or estate controlled by a boss or patron was referred to as a *seringal*, in reference to the local name for the *Hevea brasiliensis* rubber tree, *seringueira*. The value of a *seringal* depended on the number of rubber trails it encompassed (Tocantins 1979). Since a *seringal* designated an area of social control and not necessarily a standard geographic area, there was considerable variation in size from one *seringal* to another. Today's extractive reserves might encompass anywhere from one *seringal*, as is the case with the Cachoeira reserve, to 91 *seringais* in the Chico Mendes reserve (CNS 1992; Estado do Acre 1991b).

Within each *seringal* are numerous smaller holdings which originally designated the area to be worked by the various rubber tappers or *seringueiros* under the control of the boss. Each of these smaller holdings is a *colocação*. This term comes from the verb *colocar*,

¹² Recent legislation awarded these *soldados* a monthly pension which is collected by several men or their widows in this study.

meaning to place or to put. The *colocação* refers to the area where a rubber tapper was placed or *colocado* in the forest by the boss during the rubber boom. Both terms, *colocação* and *seringal* are the standard names for rubber-tapping forest tracts today.

The reference for the size of a *colocação* is the number of rubber trails that it has. Acre's earliest *colocações* during the rubber boom of the last century consisted of one to six men whose sole occupation was the extraction of latex.¹³ The only infrastructure on a *colocação* was a small hut for sleeping and a covered shed for smoking and processing the latex (Yungjohann 1989). Rubber tappers were not permitted to spend time with subsistence agriculture, hunting or fishing because this would detract from the boss' profit margin (Tocantins 1979; Weinstein 1983).

The *colocação* of the rubber boom was designed to meet the demands of a one-product economy of pure extractivism dominated by merchant capital. Today's *colocação* combines a variety of subsistence and market production strategies to meet the needs of autonomous households integrated with the capitalist market. Most households in the extractive reserve still tap rubber and also gather Brazil nuts as their primary sources of cash income. Households collect other products from the forest including various fruits, honey and housing materials. They also engage in hunting and fishing for subsistence needs. Annual crops are grown in small areas of slash-and-burn agriculture and are used mostly for home consumption with some sales of surplus harvests. Small livestock such as chickens

¹³ One rubber tapper recounted that he and his companions opened a *colocação* with 14 trails for seven men, six of whom died before the first season was over (Yungjohann 1989).

and pigs are raised near the house where some fruit trees might also be planted. Some households have a few head of cattle and perhaps a horse or mule for transportation.

The main building in a *colocação* is the house. Other infrastructure might include a storage shed, pens for small livestock, small vegetable gardens or a *casa de farinha*, a covered area for milling and toasting manioc flour. Some households have added value to their *colocação* with the installation of a mini-factory for drying, shelling and roasting Brazil nuts. Thus, the diversity of livelihood strategies, gender roles and market integration of a typical *colocação* today is quite distinct and more complex compared to the days when rubber held a monopoly on productive activities and single men lived in isolated huts in the forest.

Although the economic dominance of rubber is waning, it remains the principal factor upon which land distribution is defined. Boundaries and land ownership in the extractive reserve today still are based on the location of the rubber trails in a *colocação*.¹⁴ Accordingly, the large majority of the households that I surveyed did not know the size of their *colocação* in hectares. In 1991, responses from five households indicated an average holding of 450 hectares (range: 200-900). In 1991, four households reported their holding sizes, which averaged 840 hectares (range: 600-1200).¹⁵ The average *colocação* in Cachoeira has been

¹⁴ The average number of rubber trails per household in my sample was five (range: 0-12; N=27).

¹⁵ Changes in the reported size of holdings were due to some internal migration within my sample and the impact of a socioeconomic survey team that had been working in the reserve in 1993. Part of their survey involved estimating the size of the *colocações*, for which they used a calculation of 100 hectares per rubber trail. Several families recalled that calculation when responding to my question about the size of their holding in 1994.

estimated to be 370 hectares (Estado do Acre 1991), while researchers found a range of holdings in the Porongaba *seringal* (in the Chico Mendes reserve) of between 200-600 hectares (Nepstad et al. 1992).

Land Use Strategies in a *Colocação*

While a typical *colocação* is mostly mature forest, there are usually several cleared areas within the family's holding. Where a family builds their house, storage shed, pens for small animals or a small garden area is one such area. Houses typically have a kitchen with a wood-fired, clay stove, a front room and one or two rooms for sleeping. Houses are built several feet off the ground and usually are constructed from local palm wood of *paxiúba* (*Socratea exorrhiza*) for the floor and walls and the roof is thatched with *ouricuri* (*Attalea excelsa*). Some households that own a chainsaw or can afford to pay for hired help with a saw might have a house constructed of sawn timber. The preferred timber for construction in the *seringal* is from the Brazil nut tree, the wood of which can legally be used for housing in the reserve but the sale of which is prohibited. The house is located near a creek to facilitate access to water which must be hauled up to the house for cooking. Bathing and clothes-washing are done at the creek. None of the households in my survey had a well.

Small areas of mature forest are cut and burned each year for planting annual crops of rice, beans, corn and manioc. Few households own chainsaws or have the means to rent the use of one. The arduous labor involved in clearing and burning combines with poor market returns on annual crops to keep the size of cleared areas low. By allowing these agricultural fields to lie fallow and then using them again for annual crops, some long-standing

households have been able to meet their cropping needs without having to clear primary forest for several years. In 1991, the average size of the agricultural plots was 1.01 hectares (range: 0.25 to 2.00 ha; N=27). In 1994, the size of agricultural plots averaged 0.90 hectares (range: 0.25 to 2.00; N=23).

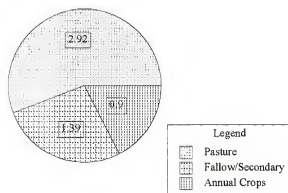


Figure 2.1 Relative Sizes of Altered Forest Areas on 28 Holdings in 1994 (ha)

Fallow agricultural fields and other areas of secondary growth that are more advanced in the process of forest regeneration constitute a third form of clearing in a *colocação*. Some such areas may have fruit trees which are still harvested. Others may be older fallow areas that have reverted to scrub forest. The average size of these areas in 1991 was 2.99 hectares (range: 0.0-8.0; N=16). In 1994, the average size was 1.39 hectares (range: 0.5-6.00; N=22). A paired samples t-test found a statistically significant difference between the size of these areas in the two sampling years (t-value=2.50; df=13; p=.027). This difference could be due to the fallow cycle as households take secondary forest areas out of fallow and re-cut and

burn them for a cycle of annual crops. Quite a few of the households in my survey reported that they had made use of secondary forest areas and had not cut mature forest for many years.

The fourth type of cleared area in a *colocação* is pasture for cattle, horses or mules. The average size of pasture per household in 1991 was 2.31 hectares (range: 0.0-15.0; N=23). In 1994, the average pasture was 2.92 per household (range: 0.0-17.5; N=22). There was no significant difference in the mean pasture areas between these two years according to a paired samples t-test ($t\text{-value} = -.63$; $df = 18$; $p = .538$). The average difference in pasture between 1991 and 1994 was 0.38 hectares (range: -7.0 to 7.0; N=19), indicating that the average pasture area per *colocação* is not increasing much.

Combining these three latter forms of clearings (agricultural fields, fallow or secondary forest areas and pasture) resulted in an average total altered forest area per household of 5.18 hectares in 1991 (range: .75-15.75; N=25) and an average of 4.89 hectares in 1994 (range: 1.00-17.75; N=23).

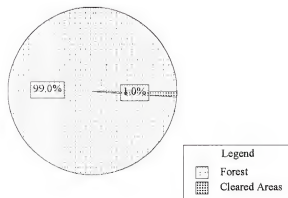


Figure 2.3 Land Use Areas in a Typical 500 ha Forest Holding (1994)

An average of 5 ha of cleared areas and/or secondary forest per household in my sample indicates that the percentage of land within the *colocação* that has been deforested is very small. Taking an average *colocação* size of 400 hectares for my sample (which is compatible with the Porongaba and Cachoeira measurements) indicates that less than 2% of the land is cleared.

Regulation of Land Use in the Extractive Reserve

In this section I examine the relationship between these clearing rates, the household-level decision-making processes involved and the rules defined by the residents' association which were designed to maintain existing forest cover in the extractive reserves. Before the advent of the extractive reserve management plans, each household decided independently how large each of these clearings would be, based on available labor, consumption needs and livestock. Unwritten rules about the size and location of forest clearing combined with limited resources to keep such areas small in relation to the primary forest tract controlled by each household. Rubber tappers avoided locating their agricultural fields and pasture in areas where there were rubber or Brazil nut trees. Some households also avoided clearing forest on the edge of creekbeds. Vigilance by neighboring families and community pressure usually was sufficient to keep families from breaking these tacit understandings about land use in the *seringal*.

There were cases, however, of small scale ranchers or of rubber tapper households who cleared larger tracts of forest for pasture. Over the years that I have visited these *seringais*, I have seen and heard of numerous instances of families who cleared and burned right up to both sides of the creekbank, even when this meant that their own water supply was severely limited or contaminated as a result. There were also cases of families who regularly felled rubber and/or Brazil nut trees as they cleared forest for their agricultural fields. Grumbings from neighboring families were heard, and the dissatisfaction went so far as to exclude certain households from community activities in some cases. There were no institutionalized means by which rubber tappers could either enforce these commonly understood land use rules or have such rules brought to bear by an outside regulator.

These unwritten rules have now become written in the management plans of each extractive reserve. Previously tacit understandings about the duty of rubber tappers to preserve the forest became legally binding regulations. The autonomy of a household's decision-making as to the size and location of forest clearings has changed. Each extractive reserve must have a management plan, jointly agreed upon by the residents' association, the CNS and IBAMA (*Instituto Brasileiro do Meio Ambiente* or the Brazilian Environmental Institute), which details the regulations and enforcement procedures to guarantee the self-sustainability of the reserve. Each resident household must sign an agreement with the federal government, agreeing to abide by such land use rules or face a fine and eventual expulsion from the reserve if infringements continue to occur.

For the Chico Mendes extractive reserve, the management plan was in draft form at the end of my research trip (CNS 1994). The plan outlines commonly-agreed upon land use

regulations for the reserve including the amount of land within the *colocação* that can be dedicated to "complementary activities" such as agriculture and livestock. Rules also apply to limit the maximum size of these areas relative to the whole *colocação*. Extractive techniques and harvesting schedules, the use of timber, fishing practices, and other management issues are addressed in the plan.

In 1994, I asked the families in my survey sample who was responsible for enforcement of these regulations and general oversight of the reserves. Of the 18 responses, 11 households (61%) responded with the correct answer: that IBAMA was responsible for enforcing reserve regulations. Of the remaining seven households, five (28%) did not know who the regulatory agency for the extractive reserves was and two households (11%) thought that the community was to be the enforcing institution. The designation of a regulation agency does not translate into effective oversight. Antonio, a former union delegate lamented that, "...the problem is that it's not well-defined [who is supposed to enforce the limits and how]. It's not going to work with rubber tappers doing the monitoring. It has to be IBAMA but they're so corrupt."

Each household is permitted to use up to 10% of their *colocação* for activities complementary to extraction, such as agriculture, livestock or fish ponds. The raising of large animals must be restricted to a maximum of 50% of the area dedicated to such complementary activities. Areas dedicated to agriculture, pasture and secondary growth may not exceed 5% of the total area of the *colocação*. Although it was not written in the draft use plan, officials in the union and the CNS informed me that the maximum amount of mature forest (*mata bruta*) that each household may clear per year is one hectare. Up to two

hectares of fallow or secondary growth (*capoeira*) may be cleared per year. Thus the maximum clearing limit is a combined total of 3ha/yr.

When I asked the surveyed families whether there was a limit on the amount of forest that could be cleared each year in the reserve, 18 of the 20 households (90%) indicated that a limit existed. I then asked what the clearing limits were. Only five of the 18 responses (18%) were correct. The responses of the other 13 households ranged from a clearing limit of 16 ha/year (more than five times the permitted area) to various combinations of limits on the size of primary and secondary forest areas that could be cleared.

To see if the forest clearing rates of the households in my sample fell within the regulated limits of the extractive reserve, I examined the differences in total cleared areas between 1991 and 1994. We saw earlier that the combined areas of agricultural fields, fallow and/or secondary forest and pasture averaged 5.18 hectares in 1991 and 4.89 hectares in 1994. I calculated the average difference in clearing over these three years to be -0.58 hectares. Responses ranged from a low of -8.75 hectares (indicating a decrease in cleared or secondary areas) to a high of 8.50 hectares.

Taking the highest annual clearing rate for 1991 to 1994 in my sample of 8.5 hectares as the worst possible case in terms of forest clearance and dividing it by three, yields an average of 2.8 hectares cleared per year by this household. Comparing this clearing rate of 2.8 ha/yr with the extractive reserve limit of 3 ha/yr indicates that overall households in my sample fall below the prescribed forest clearance regulations. Considering that the average clearing rate for all the households in the sample was -0.58 ha over three years (or -.19 ha/yr),

the extractive reserve regulations on forest clearing appear to be quite generous in terms of the surveyed households' current clearing practices.¹⁶

If this clearing limit is enforced, it effectively puts a hold on additional pasture formation in the *colocações*. "This limit is okay for planting but not for pasture", said Jose, a reserve resident. Many interviews were full of comments regarding the inability of those households that do not already have some pasture in their *colocação* to raise additional cattle. Those residents who already had a large area of pasture can now either continue to raise roughly the same amount of cattle they currently have, or rent out their pasture to neighbors, a common practice in the reserves.

When I asked the families in the survey whose job it was to monitor these clearing limits, there were mixed responses. Of the 18 families that responded, nine (50%) gave the correct response, that reserve residents were in charge of monitoring forest clearing. The next most frequent response was given by four households (22% of the sample) who said that no one was responsible for enforcement. Two families (11%) thought that the union was in charge of monitoring forest clearing, while another two families said that they did not know whose job this was. The remaining household (6% of the sample) responded that enforcement was to be done by community agents who had been recently hired to work on a development project funded by the Austrian government.

¹⁶ In choosing my sample in order to study the impact of the Brazil nut project, I stratified the population in the *seringal* and then randomly selected rubber tapping households. Small ranchers and traders, one of whom has 100 head of cattle, were thus excluded from my sample, such that existing areas of significant clearing in the reserves are not calculated here.

The management plan for the reserve charges each rubber tapper with monitoring his holding and those of other rubber tappers to ensure that the regulations of the plan are observed. This enforcement plan assumes that rubber tappers will be willing and able to monitor and report breaches of the forest clearing limit by nearby households who may be long-standing neighbors, relatives, or, in the case of those involved in the Brazil nut project, supervisors or employees. Such an assumption was regarded favorably by some of the people that I spoke with in the reserves, but many others expressed their concerns about neighboring rubber tappers monitoring forest clearing. An older man told me, "It doesn't work to have one rubber tapper monitoring the other. There's a lot of people here who don't understand the rules. It could create fights; it has to be someone from outside [the reserve to enforce clearing limits]."

There was general agreement that only a few reserve residents were disobeying the rules. The union delegate reported, "[o]nly a minority don't obey the clearing rules...Some of them have dreams of being ranchers". People's perceptions of infringements were, of course, based on their own interpretation of the clearing limit. One man who thought people were allowed to clear only one hectare/year said, "A lot of rubber tappers don't respect the limit. This year a lot of forest fell." There was also a consensus on the lack of orientation and education for the reserve residents. Altercations between neighbors could easily arise if someone who misunderstood the regulations were to confront another reserve resident about what he or she considered to be an infringement. Several people noted that others disobey the limits, but that this was due more to a lack of awareness than an intentional disrespect of the extractive reserve rules.

The Seringal: From Rubber Estate to Community

During the rubber boom and through the middle of this century, life in the *seringal* was one of physical isolation because of the distribution of rubber trees in the forest and of social isolation because of the organization of production and marketing. Tocantins notes that there has been a historical social division in the *seringal* which distinguishes between two social groups, the rubber tappers and the boss with his associates. Those affiliated with the boss included the manager, assistant, accountant, hunters and fishermen, boat operators, field hands for pasture and livestock management. The other group was the rubber tappers who worked in the "siberian isolation of the *colocação*, without social interaction, just him and the forest, him and the rubber tree". Those who lived and worked at the *barracão*, or the boss' trading post had daily contact with other employees. In contrast, the rubber tapper's life was one of social isolation (Tocantins 1979).

These social groupings gave rise to distinct social spaces within the *seringal*. As recorded by Mary Allegratti, these social spaces still exist in some areas. The *margem*, or margin, is usually on the bank of a river and represents the hub of activity in the *seringal*. Here, rubber and dry goods exchange hands at the *barracão* (Allegratti 1979). An especially well-to-do boss might even construct a simple chapel near his house for use by the occasional traveling priest (Tocantins 1979a). In contrast to the *margem*, the *centro*, or center, is the area of the rubber tappers. Deeper in the forest, isolated from social interaction as dictated by the location of the rubber trees, the rubber tappers live and work (Allegratti 1979).

In the 1970s, as roads penetrated areas that had previously been accessible only by boat, the predominance of the *margem* over the *centro* was reversed at the whim of

mapmakers. Along the BR-317 road which runs from Rio Branco to Xapuri, an older man who used to tap rubber now sells soft drinks and beer to travellers who pass by his door. He says with a laugh, "This *colocação* used to be called 'Fim do Mundo', or 'The End of the Earth' because its a five hour walk to the edge of the river where the *barracão* was. Now we call this place 'O Centro do Mundo', or 'The Center of the World!'".

The scope of space and resource use for the rubber tapper during the boom was limited to extraction and exchange. Rubber tappers' space was restricted to the rubber trails and the connections between his *colocação* in the *centro* and the *barracão* of the boss at the *margem*. Today's rubber tapper households have a much broader range of social and geographic spaces which encompass a much more diversified production and natural resource management strategy and which are integrated into a more complex economic and socio-political system.

Today, even though the household-level *colocações* remain physically isolated, there are multiple forms of organization and social relations within the *seringal* and surrounding areas. These have emerged hand-in-hand with changes in the organization of physical spaces in the *seringal*. Although the household-level *colocação* is the principal land area, some households have chosen to work together to create community spaces. There is an increasing prevalence of common-use areas in the *seringal* such as soccer fields, communal agroforestry plots or fish ponds, schools, health posts and CAEX supply posts. Collectively, these represent a changing social and spatial organization in the extractive reserves.

The base communities of the Catholic church and the union movement, which grew in response to the roads and accompanying land conflicts, were responsible for breaking the

traditional socio-spatial organization of isolated households in the *seringal*. In some *seringais*, such as those in this study, the dichotomy of *centro/margem* and boss/rubber tapper has been replaced by a more decentralized production system of autonomous households. The dyadic ties between the boss and the rubber tapper have been replaced with a multi-stranded web of social, economic and political ties within the *seringal* and between rubber tapper households and their representative organizations, the union, the CAEX and the CNS. I argue that, as the extractive reserve plans are further implemented, there will be a continued emergence of community areas within the reserves. While the concept of "community" differs from a more urbanized one of concentrated population, reserve residents refer to certain areas within a *seringal* (or the whole *seringal* itself in the case of a smaller tract) as *comunidade São Francisco* or a *comunidade Floresta*.

Due to the physical separation of households in the *seringal*, communities as such are numerically small. "Communities" in the reserves may consist of five to 25 households that meet fairly regularly, either through the Sunday morning base community of the church, union meetings with the local delegate or to clear pasture area for the CAEX's transport mules. The community also serves as an address and as a social identity. Many times in union assemblies in the city of Xapuri, rubber tappers would refer to another group by the name of their *seringal* or the central *colocação* in that area. These central *colocações* oftentimes are the location of the school, health post and CAEX supply store.

The communities that are being formed within the extractive reserves and the larger "community" or movement of rubber tappers in Xapuri are not without internal conflict, mistrust or unneighborly disputes. As the management plans for the extractive reserves are

implemented, and as the CAEX and union amplify their services and activities, I postulate that there will emerge a variation of such communities within the reserves. This process will have varying results, depending on the history of socio-political mobilization, different levels of participation in the Catholic church's base communities, or perhaps the number and strength of intra- or inter-familial ties in the area. These social variations, combined with structural factors such as the variation in resource access, transportation and physical isolation will most likely result in a mosaic of heterogeneous communities throughout the reserves with some being much more active in the movement's institutions and others being less so. In the final section of this chapter, I discuss shifting social and gender roles and the difficulties faced by these organizations in meeting the changing needs of extractive reserve residents.

Creating New Social Roles and Spaces

Gender roles and the sexual division of labor have changed dramatically from the days of single men living in isolated huts in the forest. This study pays particular attention to gender as a critical variable in determining access to and control over resources, the dynamics of which will determine in part the viability of extractive reserves. Awareness of gender-differentiated roles in livelihood strategies is crucial to understanding the complex dynamics of household resource management (Agarwal 1994; Deere 1990, 1995; Poats et al. 1988; Sage 1993). In the extractive reserves, knowing who has access to and control over certain resources or particular physical spaces should be considered when drawing up management plans which must be subscribed to by the resident population. These variables of access and control vary significantly between and within households. Such variation in access and

control is a key determinant of resource management within households. Along with this variation in productive aspects, it is also critical that those involved in such projects, from participating households to donors, understand the value and fluidity of traditional social roles in the households and communities of the *seringal*.

Lack of recognition of these social roles can be devastating to extractive reserve projects and those involved. One such project involved hiring reserve residents as community agents. As dictated by the donor agency, project staff hired men and women to work together on teams. The job of these men and women was to travel to different *seringais* within the reserves and encourage community organization through meetings and household visits. Antonia, a mother of five and an active participant in her church group, was hired by this project. She traveled with the three men on her team to neighboring areas and, according to project staff, carried out her job well in spite of the difficulties of being the only woman in a very challenging situation. Upon returning home, her participation in the project exacerbated existing difficulties between Antonia and her husband. She ended up taking several of the younger children and leaving him. In a later discussion with a leader of the CAEX, he used Antonia's case as an example.

Once she earned her own money, she started making demands and made him jealous because of what she had earned. She wanted to live her life and it didn't work out and now they're separated.

Hiring men and women to make overnight trips together within the *seringal* reflected a lack of sensitivity and awareness of social roles on the part of project staff. As a sole women working with three men, Antonia's trips with her team were inappropriate in the eyes of the

community and her husband. The fall-out from this experience could well be an unwillingness on the part of union and CAEX organizers to involve women as leaders in future projects. Women may also refrain (or be withheld by their husbands) from participating in other community efforts.

As will be seen in Chapter 3, the Brazil nut project that is the focus of this study provides socially acceptable opportunities for women to work in different social arrangements and to gain new skills. Women and men work together in community-level factories, one of which is managed by a young woman. As extractive reserve residents work together to define new production strategies and forms of community organization, shifts in traditional gender roles are bound to occur. However, these shifts should not be externally imposed, albeit via well-intentioned directives from donor agencies.

As I have discussed elsewhere, gender roles in the rubber tappers movement are in a process of re-definition as individuals, households and communities invest themselves in defining and managing the extractive reserves (Campbell forthcoming). In some families, the male head of household maintains the traditional role of holding sole responsibility for marketing decisions and transactions. In other cases, the oldest son may be the family's political representative in the union and the cooperative. Women who work in the family's agricultural fields and in domestic tasks near the home may be perceived as making less of a contribution to the household, thus negatively affecting perceptions of what women are entitled to and decreasing their bargaining or breakdown position (Jaquette 1993; Sen 1990). The work of those household members who engage in activities which bring in visible cash income, such as rubber and Brazil nuts, may be considered more valuable to the household's

livelihood. Such valuations can affect decisions as to who should attend school, who should be allowed to participate in the community meeting or the church gathering, who should join the union and vote in the upcoming elections or who should work in the Brazil nut project.

In Chapter 4, it will be shown that the traditional role of the male head of household as the earner and controller of the family's cash income is changing dramatically. In a few households involved in the Brazil nut project, the wife now earns more than her husband. Several women in this study who have turned 55 years of age now receive an agricultural worker's retirement package from the state which is worth more than the household's other sources of income. As a project organizer said of the Brazil nut project and other initiatives in the extractive reserve plan,

. . . the introduction of producer groups and other projects such as the Brazil nut processing affects the basic economic and social structure of *seringueiro* households. It changes the relationship between men and women. With these economic changes, if there isn't discussion in the family and in the community before the project begins, it might happen that [the man would say], 'Now, she earns more than me! Who's in charge here?'. This generates conflict. The extractive reserve concept proposes to liberate and give value to everyone, including women.... The projects might liberate women but you'll have these conflicts. If you mess with the family structure and don't encourage or amplify this discussion, you'll have conflict. The survival of the extractive reserves depends on these discussions. You have to work on the day-to-day issues.¹⁷

In this study's examination of changing livelihood and decision-making strategies, it will be shown that these issues of access and control are central to the well-being and survival of households in the extractive reserve.

Organizing Effectively to Meet Changing Needs

¹⁷ Field interview with the Project Coordinator, Rede Acreana de Mulheres e Homens. October 25, 1994; Rio Branco, Acre.

I close this chapter with an examination of the social organizations that the rubber tappers created as part of their social movement. This discussion focuses on the ability and the potential of the rural workers' union and the CAEX to meet the needs of the extractive reserve residents. Whether or not the union and the CAEX can complement this process over the long-term could determine the viability of the reserves. The transformed social and economic relations in the *seringal* mean that the reserve residents increasingly rely on these organizations for cooperative marketing, political representation and emergency assistance--services that traditionally were provided by the boss. Here I present the opinions of surveyed households regarding the performance of the union and the CAEX in light of the social and economic transformations within the *seringal*.

The Union of Rural Workers in Xapuri had a total membership of 4,264 by the end of September 1994. Of these, 233, or 5.5% were women. Union officials and reserve residents all concurred in noting that the total number of members was not indicative of active participation. Of the over 4,000 members whose signatures appeared on the registration book, over 1,000 of these individuals either died or are no longer active, dues-paying members. The clerk in the union office estimated that there were only approximately 150 members who regularly pay their monthly dues, which were US \$0.85 in September 1994.¹⁸

This represents a vicious circle for the union and its membership. Without general operating funds, elected union officials (who receive no salary) have no means to make phone

¹⁸ A former union president told me that this has been a perennial problem. Even in the union's heyday when Chico Mendes was president, there were over 2,000 "members" as reported in the press and promoted by union leaders. However, less than 10% of these members were actively paying monthly dues at the time.

calls or write proposals for project funding.¹⁹ They are then easy targets for complaints by union members who told me that the elected leaders, "spend all their time in town and don't come out to the areas (*seringais*) anymore". In 1994, when I asked union members if they were satisfied with the union's operations, 55% of the 20 responses were negative. The most telling sign of this dissatisfaction came from comparing responses from 1991 and 1994 to my question about the benefits provided by the union. In 1991, 29% of the respondents indicated that union membership brought them no benefits. By 1994, this response had doubled to 60%.

Evaluations of the union today and how it might be in the future were mixed. When I asked the families what they saw for the future of the union, their answers were more optimistic. Of 18 responses, 67% indicated that the union would improve and continue to grow. Those who were less optimistic consisted of 22% of the households which expected the union to cease functioning. The remaining 11% responded that they weren't sure what the union would be like in the future.

Opinions were also mixed about the opportunities for women to play a more active and influential role in the union. Of 20 union member households that I surveyed in the reserve, 65% thought that women would be increasingly active and influential in the union. Of these same households, 70% responded that a woman could be elected president of the union within the next five years. However, of the 25% who thought it would be impossible, there were several women who were very active in the women's group of the union. They

¹⁹ While I was working in the union office with the clerk, the lights went out because the union had not paid the electric bill for several months.

indicated that no women had the opportunity to gain the necessary leadership skills and that *machista* attitudes toward women in the *seringal* and in the union would prevent such an election.²⁰

Some households credited the union with the existence of the extractive reserves and services such as the schools, health posts and the CAEX. The general tone, however, was that the union was less and less able to meet the demands of its membership. This may well be due to changes in union membership. More young people and women have joined the union in recent years. Table 2.1 shows the changes in union membership of the households that I surveyed in 1991 and 1994. Increasing numbers of women and young men joined the union over the period of my survey according to field interviews and union records.

Table 2.1 Frequency of Union Membership of Selected Groups of Surveyed Reserve Residents

	Male Heads of Household	Female Heads of Household	Sons over 18 years of age
1991	85% (22 of 26)	32% (9 of 28)	46% (5 of 11)
1994	86% (18 of 21)	37% (8 of 22)	64% (7 of 11)

²⁰ See Campbell (forthcoming) for more on the changing role of women in the rubber tappers' movement.

Union records show that, prior to 1991, single young women comprised just 26% of the female membership. From 1991 to 1994, this group accounted for over 50% of women members. This is an important shift, considering that 70% of the first women to join the union were widows and were the sole political representative of the household.

Today, with more single and married women and more young men in the union, the rights and responsibilities of political representation are shared with husbands or fathers. The increasing dissonance between members' opinions of union operations and the ability of elected leaders to meet members' expectations is likely due to this shifting membership composition and could be attributed in part to generational differences in attitudes and ideas about social organization.

A very important benefit that can be credited to the union's work is the increasing access to state services of the households that I surveyed. Some households acknowledged the union's assistance in filling out paperwork and educating them about their rights as rural workers. As will be seen in Chapter 4, many households in the reserve now receive either agricultural workers' retirement payments, pensions for service by a *soldado da borracha* during World War II, or other payments from the federal health fund for those with physical disabilities. The role of the union in educating members about their rights and access to these services is often not recognized but is crucial to many household economies in the reserve.

The other organization in the rubber tappers' movement that will be discussed here is the CAEX. The next chapter examines one of the CAEX's project activities and presents more general information on CAEX's operations. Here, I discuss CAEX in relation to the social and economic transformations within the extractive reserves.

One of the main challenges facing the CAEX in regards to its membership is the ideological shift from a dyadic, patron-client relationship to a collective economy comprised of autonomous households. In the process of constructing communities within this transformed economy, households in the reserve are creating a web of inter-household social and economic relations which is tied to the CAEX. Those households which have not joined in this process and are not members of the CAEX, are forced to depend on increasingly unreliable local traders. As will be shown in Chapter 4, households that are not CAEX members had significantly lower income levels and weaker economic outlooks than those who have invested in the process of constructing a community within a transformed, collective economy.

In 1991, 31% of the men over 18 years of age in my survey sample were CAEX members. By 1994, this had grown to 44% of the adult men in my survey. As of December 1994, there were 251 CAEX members listed in the registration book. There are approximately 4,000 families in the Chico Mendes reserve alone. The task of providing market services to even a small fraction of this many households is daunting. Many people in my survey noted how fortunate they were to have the CAEX. They often remarked on the difficulties faced by families who lived more in the *centro* of the *seringal* where the CAEX had not yet established supply posts or regular transportation. Some of these households are several day's walk from the city of Xapuri via forest trails. A study which included marketing channels within the *seringal* found that 60% of the households in the Chico Mendes reserve relied on *marreteiros*, or travelling middlemen, for their dry goods supplies. This differs

dramatically from the situation in the Cachoeira reserve, which is much smaller, wherein 79% of the residents use the CAEX as their main supplier (CNS et. al, 1992).

When I asked CAEX members about their opinions of CAEX prices, both for buying rubber and Brazil nuts and for selling dry goods, all of the responses indicated that CAEX pays more than local traders for rubber and Brazil nuts. The responses on the relative prices of dry goods were mixed. All in all, members were satisfied with the economic performance of the CAEX. On the administrative side, however, there were numerous complaints. Concerns included the large number of employees at the central office who were seen as doing very little work, the constant travelling by the CAEX president and the inattention of other elected leaders to the day-to-day operations of the cooperative. Specifically related to the Brazil nut project which is highlighted in the next chapter, CAEX was late in issuing paychecks due to a lack of operating capital. An engineer from ECOTEC was responsible for project management and received very high praise from those working on the project. Households participating in the Brazil nut project expressed concern about the future of project management after the scheduled departure of this engineer from the CAEX. Despite these complaints, members expressed overall satisfaction with the CAEX and expected it to grow in terms of membership and to improve in coming years.

CAEX membership tends to be limited to male heads of household. There were no cases of any households having more than one CAEX member and there were no cases of any female heads of household members in my sample. Even in the case of a female-headed household, she had transferred her membership into her son's name. This seems to be on the

verge of changing, however, as more women gain the economic means to pay the initial membership dues and the social confidence to join the CAEX (Campbell, forthcoming).

Even though some households have not joined the CAEX, this does not signify an unwillingness to do so. Initial dues to join the cooperative are 50kg of rubber, or the equivalent in another product. At the end of 1994, this amounted to roughly US\$45.00. As shown in Table 2.2, this payment has kept some female heads of household from joining. Overall, 39% of those interviewed indicated that they intended to join or would like to join if they could come up with the initial dues payment.

Table 2.2 Attitudes of Non-CAEX Members Regarding CAEX Membership

ATTITUDES REGARDING MEMBERSHIP IN THE CAEX	Male heads of household (N=5)	Female heads of household (N=8)	Sons over 18 years of age (N=5)
Intend to join	40% (2)	12.5% (1)	60% (3)
Not interested/CAEX has no benefits	40% (2)	50% (4)	40% (2)
Put membership in son's name	20% (1)	12.5% (1)	---
Would like to join but cannot pay the dues	---	25% (2)	---

Several households in my survey who are not CAEX members said that they would like to join but that the CAEX did not meet their needs with its present level of service. They wanted the CAEX to fulfill its promise to construct a supply post nearer to their home before they joined. For the time being, they had to depend on an increasingly unreliable local trader. Several households told me that it was almost impossible for them to buy or sell goods in the *seringal*. Local traders were so decapitalized that they could not get credit with which to purchase dry goods for resale to reserve residents.

These accounts of economic hardships were reinforced by a former rubber boss during a meeting that we had in Xapuri. He told me,

When I came here from Ceará in 1954, everything was different. Before, in the days when the bosses were in charge, you could go out to the *seringal* for days at a time and you didn't need to take anything with you. Not a hammock or extra food or anything. They offered you lots of food and were offended if you didn't accept. When they got sick, it was the responsibility of the boss to take care of them. Now they're out there dying of hunger. There aren't any traders that go out there because they can't make any money. All the rubber tappers want to leave the *seringal* because they can't make it and because they don't have a boss to take care of them and manage the *seringais*.

One of the greatest challenges for the CAEX, the union and the rubber tappers involves the ideological shift from the traditional, dyadic patron-client relationships with the boss or trader to a cooperative, empowered relationship among other rubber tapper households. Adelberto, one of the CAEX leaders told me of the difficulties he experienced in his own *seringal* when attempting to stimulate community work days for an agroforestry project. His neighbors were reluctant to invest their time in the project because they were unaccustomed to such initiatives. Even though they have secure land tenure, many of his

neighbors still think in terms of being controlled by the boss, by whom their productive and marketing options were limited. He said, "That's how we have to think. We have to feel like we're the boss now".

This is a difficult process for both men and women in the extractive reserves. Elsewhere I have explored the challenges that face women who seek to expand their role in the household, the CAEX and the union (Campbell, forthcoming). Even for men who are accustomed to doing all of the buying and selling for their households, either via middlemen or the CAEX, the concept of being a voting member in the cooperative and having some say in its operations is quite different from their earlier marketing experiences. João is a young *seringueiro* who manages one of the Brazil nut project sites which are described in the next chapter. He told me that it was very difficult for him to get up the nerve to speak up at the CAEX when the employees were not doing their job to his satisfaction. "We have to remember that we, the CAEX members, hired these guys and we are their bosses now. If they're just sitting around or if I need to get going and I need them to get my paycheck ready, I'm not afraid to tell them, 'Look, I'm a member here and you work for us'. I get frustrated with *seringueiros* who complain about the service at the CAEX but they won't speak up and say anything".

There may be generational differences in the rubber tappers' conceptualization and operationalization of these shifts from the patron-client days to today's autonomous, collective production and marketing systems. Adelberto told me of a conversation that he had with his father.

I've been working in the *movimento* [the rubber tappers' social movement] for 14 years. The other day my dad came shaking his finger at me and saying, 'See, if you'd been tapping rubber all this time, you'd be better off.' And I felt like telling him, 'Look, you've been tapping rubber your whole life and look where it's gotten you.'

These are some of the most pressing challenges facing the rubber tappers movement, the union and the CAEX. David Bray has noted this process in other producer groups as they move from a shared history of struggle in a socio-political movement to one of cooperative production and marketing, a process that he has termed "from protest to production" (Bray 1991, p. 126). The rubber tappers' social movement has gone through a similar transition from the days of the *empates* which focused on civil protest in order to secure their rights to their traditional forest tracts. As the movement has become institutionalized through the union, school and health projects, the CNS, the CAEX and various extractive reserve projects in research and extension, the *seringueiros* and their families are creating communities out of their shared history of struggle combined with their ability to formalize this cooperation through these organizations. My earlier research found that this shared history of struggle was an essential element in this process of forming informal and formal ties between neighbors to sustain community activities. In that study, the experiences of two extractive reserves in relation to a popular education project differed greatly due to the shared history of sacrifice and bloodshed in the *empates* of one area versus the lack of prior cooperation between neighbors in an area which received numerous extractive reserve benefits without much active solicitation (Campbell 1990).

Many people discussed the current economic situation of families who live in the more remote parts of the reserves, where there are few, if any, services provided by either the state

or the movement via CAEX or the union. One woman noted, "During our struggle, the rubber tapper became free from the boss. But for many of them, he also is now free of the union and the CAEX." Providing sufficient and effective collective marketing services for all reserve residents is an immense task. While households within the extractive reserve are creating communities and transforming social and economic relationships, there is another process of significant proportion taking place at the interface of the reserve and marketing channels, government agencies and donor agencies. This is the process of local institution building (Schmink 1992), which is essential to the viability of the reserves. The ability of the CAEX, the union and the CNS to collaborate with the emerging community structures in the reserves to implement alternative production strategies is a key facet of the extractive reserve model. The next two chapters examine the impact of one such production alternative in two extractive reserve communities.

CHAPTER 3 TRANSFORMING TRADITIONAL ECONOMIES

One of the economic objectives of the extractive reserve model is to add value to forest products through new technologies and cooperative marketing which would eliminate the traditional exploitative relationships such as *aviamento*, the chain of debt-peonage of the rubber boom era. In this chapter, I look specifically at one ongoing project intervention in two extractive reserves in light of the broader goals of the reserve model and the needs of reserve populations. The project under examination is the decentralized, post-harvest processing of Brazil nuts in the reserves which is linked to the CAEX factory in Xapuri. This initiative was designed to address the question of economic viability of the reserves through four strategies: (1) decentralization of the post-harvest processing of Brazil nuts; (2) increased efficiency in processing by the CAEX through technological and labor changes; (3) promotion of rational use of Brazil nuts in the forest and in agroforestry systems; and, (4) evaluation of current economic policies relating to Brazil nut production and marketing and the definition of alternative policies to encourage the production of Brazil nuts and other potentially sustainable extractive products (ECOTEC and CNS 1990).

Here and in Chapter 4, I address primarily the first objective which sought in part to increase economic returns to extractive reserve residents through decentralized processing

of Brazil nuts.¹ My research questions focus on the relationship between the economic autonomy of rubber tapper households and the sale of wage labor due to the project. While the classic Marxist line of reasoning assumes that the creation of wage labor work eventually leads to proletarianization, I argue that this project instead offers opportunities for households and individuals to combine piece-work for cash income with traditional subsistence activities. Due to the forms of production within the project, households and individuals can increase their economic autonomy by investing in community or household-level processing units. In this way, they are able to increase their cash income through the sale of their labor, without losing control of the production process.

I also explore the impact of the project on the cultural identity and social organization of rubber tapper households within the extractive reserve. As production alternatives are introduced in the extractive reserves in order to diversify and improve income levels, there is a strong potential for alteration of traditional work relations and the human-nature relationships upon which the rubber tappers' movement was founded. An increasing reliance upon wage labor (from the project and other sources) as one component of extractive reserve household economies could intensify an ongoing process of abandonment of rubber tapping. Changes in the cultural and market values of non-timber forest products affect household and individual decisions regarding the allocation of labor in certain activities as opposed to another. This reflects the "ecological rationality" (Toledo 1990) of production systems in the extractive reserves. I also examine the relative income earned by reserve residents in these

¹ Other project objectives have been addressed by other researchers and evaluators. See Hecht et al. (1994); Rebohle (1991); Richardson (1995); and Anthony Anderson (1996).

different decentralized processing arrangements to determine the extent to which the project affects socioeconomic differentiation within the extractive reserve.

In order to contextualize the Brazil nut project within the broader ecological and socioeconomic arena of the extractive reserves in southeastern Acre, I first present an overview of the botanical, marketing and technological aspects of Brazil nut processing. This background will help to assess the potential for rational use of the resource, and for increased efficiency in processing to improve potential income.

Management and Processing of Brazil Nut (*castanha*) *Bertholletia excelsa*

Although the Brazil nut is an important source of income for the Amazon basin, and almost all of the current Brazil nut crop is harvested from wild trees (Mori and Prance 1990), Virgílio Viana points out that little research has been done to date on the management of natural populations (Viana et al. n.d.). Since deforested areas in Acre cover less than 10% of the state, and conventional agricultural and forestry research do not meet the needs of extractive producers for improved natural forest management practices, he and his colleagues call for increased funding for applied ecological research on Brazil nut and other species (Viana et al. n.d.). Such research could provide the means for increased productivity and practice of natural forest management, including practices related to the native Brazil nut populations in the two extractive reserves in this study.

Stephen Nugent (1991) assiduously warns that such techniques and practices could be detrimental to the livelihood of small producers unless they are part of a larger "agro-strategy" which encompasses land tenure, market stability and the local variation of

production and marketing strategies. However, the economic importance of Brazil nuts to the producers in this study is increasing due to the post-harvest processing initiatives of CAEX. Applied research into management practices, reproduction biology and productivity of this species can be effective within the context of the extractive reserves, in which producers have guaranteed land tenure and have effectively organized for political lobbying and for cooperative marketing.

Distribution, Regeneration and Productivity of Brazil Nut Trees

The Brazil nut tree is a member of the Lecythidaceae family. Its natural territory is primary, lowland moist forest and it does best on well-drained oxisols and ultisols. The average rainfall for areas where Brazil nut is found is 1400-2800 mm and the average annual temperature is 24-27 degrees Celsius. The Brazil nut is a canopy tree and sometimes grows to emergent size (Clement 1993) with an average height of 40-50 meters and a diameter of 2 meters when mature (Cavalcante 1991). There are reports of two trees that each reached 62 meters in height and had trunks 4.3 meters in diameter.² Both trees were probably between 800-1200 years old (Cavalcante 1991).

The Brazil nut tree is a native of Amazonia with its current distribution ranging over almost all of the basin in Bolivia, Peru, Colombia, Venezuela and the Guyanas (Cavalcante 1991; Clement 1993). Charles Peters noted that Brazil nut generally occurs at fairly low densities in the forest (Peters 1992). Clement reports that the density of Brazil nut trees is

² One of these two trees was measured after it had been cut down in the Jarí plantation area.

usually less than 1 tree/ha (Clement 1993), while Richardson reports densities from 0.1 to 2.5 trees/ha (Richardson 1995).

In contrast to the generally low density in most forest areas, Brazil nut trees are often found in fairly extensive groupings known as *castanhais* (Cavalcante 1991) or *manchales* in Peru (Clement 1993). There is strong evidence for human dispersal of the Brazil nut by Amerindians who planted seeds and/or seedlings to create today's "natural" *castanhais* (Posey 1985). Densities of up to 15-20 mature trees/ha may be reached in these areas which range from 5-10 ha or more in size. Some *castanhais* in the southeastern regions of the states of Pará and Acre are 50-100 ha in size (Clement 1993).

However, the large size of these *castanhais* in Acre does not necessarily indicate a generally high occurrence of Brazil nut trees or of productive trees throughout the state. Many households that I surveyed in the Floresta *seringal* in southeastern Acre have very low levels of productivity from the Brazil nut trees on their holdings and there are no Brazil nuts reported in the Alto Juruá extractive reserve (Almeida and Menezes 1994).

In one of my research sites, which is known for its relatively higher Brazil nut production, researchers found a density of 5.86 plants/ha over 1 meter in height, with the density of adult trees (> 40 cm dbh) being 1.92 trees/ha (Viana et al. n.d.). In the Porongaba *seringal* within the Chico Mendes reserve, Daniel Nepstad and colleagues found an average of 350 Brazil nut trees/*colocação* (Nepstad et al. 1992). A survey that encompassed the Chico Mendes extractive reserve found an average of 257 Brazil nut trees/holding, over half of which were productive adult trees (CNS 1992).

In 1991, when I asked 28 families in the Floresta and Cachoeira *seringais* if they knew how many Brazil nut trees were in their forest holding, only six (21%) gave a positive response. Their answers ranged from 150 to 1000 trees with an average of 325 Brazil nut trees/holding. Their lack of knowledge about the number of trees is likely due to the fact that all of these trees are wild and that they are managed or visited on an infrequent basis. As opposed to rubber trees which are visited up to two times per week during the lengthier tapping season, Brazil nut trees might be visited only several times during the year. Only one of the 28 households that I visited reported having ever planted Brazil nut trees. In this case, they had planted 25 trees several years earlier.

One component of the Brazil nut project sponsored by CAEX sought to carry out research and promote rational use of Brazil nut trees in the forest and in agroforestry systems (ECOTEC and CNS 1990). Although some steps of this component were carried out, including research on Brazil nut density and seedling performance, the establishment of seed beds and the production of some seedlings, the project did not fulfill the stated objectives in this area. High staff turnover and lack of accompaniment through extension efforts resulted in abandonment of the project areas by reserve residents. A few households planted seedlings that were made available to them through the project but there were no systematic results in agroforestry or natural forest management plots. Karen Kainer, a University of Florida doctoral candidate who conducted research on the autoecology of Brazil nut seedlings in Cachoeira in 1993-1994, noted that the few cases of Brazil nut plantings by residents in that area were done with some technical assistance by the project. While people in other areas have transplanted seedlings from the forest to agricultural plots, producing seedlings from

seed is more difficult and most likely would require some technical assistance to achieve a successful level of production.

Regeneration of Native Stands

Brazil nut seeds may take 12-36 months to germinate, and even then only 60% germinate successfully (Clement 1993). In the eastern Amazon, Chris Miller noted that there were no juvenile seedlings in the Jari plantation area, but that seedlings of all age classes were found in the forests of the Marabá and Carajas areas (Miller 1990). Closer to the *seringais* in this study, residents of the Porongaba area in the Chico Mendes reserve reported a lack of juvenile Brazil nut trees (Nepstad et al. 1992). This could be due to a variety of factors, including the practice of burning leaves and debris under the mature trees to facilitate collection, low regeneration rates, overharvesting, reduced numbers of dispersal agents due to hunting, and seed fungus (Nepstad et al. 1992). Some of these factors could be addressed through research and management.

In contrast to the findings of low numbers of juvenile trees in the Porongaba *seringal*, residents in the Floresta *seringal* in this study noted that there were plenty of seedlings and adult trees in the forest. However, these did not produce worthwhile quantities of nuts. Unlike Porongaba and Floresta, researchers in the Cachoeira *seringal* found a higher density of juvenile plants (3.78 plants/ha) than adults (2.02 plants/ha) in their sampled transects (Viana et al. n.d.). Kainer reported that reproduction in native stands did not appear to be a limiting factor in the Cachoeira area, but that research on this issue was urgently needed in this and other *seringais*. (Kainer, pers. comm.).

Harvest Levels

The fruit or *ouriço* of the Brazil nut tree weighs between 500-1500 g and measures 10-15 cm in diameter. Each fruit contains between 15-24 seeds (what we call the nut). Each nut is 4-7 cm in length and weighs 4-10 grams (Clement 1993). In the Cachoeira *seringal*, Viana and colleagues found that the number of kgs of nuts in the shell ranged from 1.5 to 105 kg/tree/yr and averaged 24.0 kg/tree (Viana et al. n.d.). The nuts are roughly 50% kernel and 50% shell by weight (Richardson 1995). Estimates for the CAEX project calculated that 66% of the weight of the nut is in the shell, all of which would be removed through the decentralized processing, thus significantly reducing transport costs (ECOTEC and CNS 1990).

The Brazil nut flowers during the dry season and fruits 15 months later during the rainy season, roughly December-March. First fruiting of Brazil nut trees usually occurs at 12 years of age but this can be reduced to 6 years through grafting, with cases of first fruiting in 3.5 years (Cavalcante 1991). Once the fruit of the Brazil nut ripens and falls to the forest floor from the canopy, harvesters break open the fruit with a machete and remove the nuts.

As with reproduction, what is known about Brazil nut harvests shows fluctuation over time and significant differences in productivity between *seringais*. My data show that the productivity of Brazil nut trees varies significantly from one *seringal* to another, as measured in harvesting levels. A study in the eastern Amazon noted that harvest levels also vary from one year to the next and tend to exhibit fluctuations in two to three year cycles (Miller 1990), a trend that also was reported by households in my survey sample.

In southeastern Acre, different *seringais* have produced varying harvest levels. Research conducted in the Chico Mendes extractive reserve found that the annual production of in-shell Brazil nuts per holding averaged 1375 kgs (CNS 1992b).³ In the Porongaba *seringal* which lies within this reserve, the average annual production rate was 9 kg/tree or 3150 kg/holding (Nepstad et al. 1992). In the Cachoeira reserve, annual production estimates ranged from 4,500 kg/holding (Schwartzman 1989) to 5,500 kg/holding (ECOTEC and CNS 1990).⁴

Table 3.1 indicates that there were significant differences in the harvest levels between the Floresta and Cachoeira *seringais* in 1991 and 1994. This table does not directly measure production per tree. Rather, because households in both *seringais* reported that they harvested most of the Brazil nuts in their holdings, this table reflects the relative productivity of the trees in each research site. Floresta residents stated that they had numerous Brazil nut trees (including seedlings) in their *colocações* but that the productivity of these trees was very low. Thus, the distribution and productivity of this resource places important limits on its potential for increasing income for reserve residents.

³ This report noted the average annual harvest/holding to be 125 *latas*, which I converted to kgs using a calculation of 11 kgs/*lata*.

⁴ For Cachoeira, Schwartzman reported a mean annual harvest per family of "325 *latas* (or 4,500 kg)" (Schwartzman 1989, p.155), using a generous calculation of 13.85 kg/*lata*. ECOTEC reported an estimated annual harvest per holding of 500 *latas*, which I converted to 5,500 kg/holding using Kainer's estimate of approximately 11 kg/*lata*.

Table 3.1 Comparative Brazil Nut Harvests (kg of in-shell nuts/holding)

	1991		1994	
	Floresta	Cachoeira	Floresta	Cachoeira
median	495 (n=19)	6490 (n=8)	302.5 (n=16)	6600 (n=7)
range	0-5500	1650-17,600	0-3300	3080-9020
mean difference	5672		5612	
t value	4.66		8.17	
df	25		21	
p	.000		.000	

Source: Field interviews by the author

Note: Respondents' answers in *latas* were converted to kgs using the conversion of 11 kg/*lata*.

If households continue to rely on existing forest stands of Brazil nut, those in the Floresta *seringal* will be at a significant disadvantage to those in Cachoeira. According to the average harvest/holding reported by the CNS for the Chico Mendes reserve in general (of which Floresta is part), residents in this large reserve share this lack of access to productive stands of Brazil nut trees (CNS 1992). As will be shown later in this chapter, harvest levels of Brazil nut are important since they determine whether or not households are eligible for involvement in the different processing arrangements available in the project.

In the extractive reserves, each household controls access to the forest resources in its *colocação*. This prevents harvesters other than reserve residents from gaining access to the Brazil nut trees, thus denying competitive harvesting on the same forest area. The boundary between one household and another within the reserve is respected to the degree

that neighboring households share the harvest from a Brazil nut tree which lies along the boundary, with each household gathering those nuts that had fallen on their side of the boundary (Schwartzman 1989).

Thus, access to and control over a more productive stand of Brazil nut on one's *colocação* could signify a much higher potential for increased income, both from harvest levels and from value-added through post-harvest processing. Forest management practices and post-harvest handling and storage techniques could increase the quality and quantity of nuts that are sold. These practices and techniques are discussed in the following section. Additional income increases due to post-harvest processing (shelling and drying) are discussed later in this chapter along with analysis of the Brazil nut project.

Potential Increases Through Forest Management and Post-Harvest Handling

Clement argues that production could be increased by harvesting trees that currently are left unexploited because of the low price paid to collectors. He maintains that these prices are low due to weak international demand and the high number of middlemen who effectively reduce payment made to the collector. He notes that the extractive reserves and marketing agreements with Cultural Survival should address these issues (Clement 1993). However, my own data from this and previous research projects show that collectors surveyed in two extractive reserves in Acre currently gather almost all available Brazil nuts. In 1991, 85% of the 26 households I interviewed indicated that they gather all the Brazil nuts in their *colocação*. In 1994, 79% of the 24 surveyed households gave the same response. In both of these survey years and in previous research in the same area, families that did not harvest

all the nuts from the trees to which they had access reported that they "leave some for the animals", indicating that they do not leave large quantities unharvested (Campbell 1990 unpublished data). While there are a few families in the reserve who refrain from harvesting nuts, the potential increase in harvest levels due to a price increase would likely be minimal compared to present extraction levels from the study area.

Improved storage facilities in the extractive reserves to reduce post-harvest spoilage could, however, be implemented in response to a higher market price for Brazil nuts. Higher value for this product could encourage households to harvest nuts more frequently during the season so that nuts do not remain soaked in rainwater on the forest floor for as long a period of time. Harvesters tend to gather the Brazil nut pods together in piles in the forest until they have a sufficient quantity built up. They then spend the better part of a day at these sites, breaking open the pods with a machete and removing the nuts. In the meantime, some pods become water-logged and the nuts inside are prone to rotting.

Once the Brazil nuts are harvested from the forest, they often sit in storage for up to several months before being transported or processed. Since the nuts are often wet from time spent on the forest floor prior to collection or due to poor storage facilities, there are often high losses from fungus. However, if the nuts are kept away from outside moisture, they can remain stored for up to a year without losing flavor.

Post-harvest losses could be reduced by modifying current harvesting, storage and transportation practices. Nuts that are gathered during the harvest (December-March) and

then stored until processing (May-November) have a much higher chance of rotting.⁵ One of the mini-factory managers in the reserve suggested that nuts should be stored in two separate sheds to avoid losses. Nuts harvested from December through January tend not to be as wet and would be stored in one shed. Nuts harvested in February and March, the peak of the rainy season, are usually waterlogged and would go into a separate shed. They would first process the wetter nuts in the February/March shed when the processing season begins. They could then move to the drier December/January nuts later in the processing season.

With these practices, it is possible that higher market value could incrementally increase the quantity and the quality of nuts that producers sell due to improved handling and storage of nuts gathered from currently productive forest stands. However, these increases would be due more to efficient harvesting and storage practices, rather than from larger harvests from existing natural stands of Brazil nuts. (Other management practices such as those described below, also could increase the productivity of native stands). Thus, it should be possible to increase efficiency and rational use of native stands of Brazil nuts without increasing current levels of environmental impact.

Along with modifications in harvesting and storage practices, natural forest management practices could be implemented to increase the productivity of natural stands of Brazil nut. Viana and colleagues call for research on such practices as enrichment plantings in secondary forests, forest gaps, agroforestry systems and liberation thinning of suppressed, non-reproductive individuals in natural populations (Viana et al. n.d.). Based on research in

⁵ The manager of the urban factory reported that they began processing in June, 1994. He hoped that they would be able to start processing as early as February in the following year, thus reducing storage time.

the Chico Mendes extractive reserve, Nepstad et al. note that the lack of juvenile Brazil nut trees is due to a combination of factors. They report that, in addition to other variables, the overharvesting of Brazil nuts, overhunting of certain game animals which act as dispersal agents, the practice of burning debris underneath adult trees to facilitate collection and the dependence of seedlings on forest gaps could each contribute to low reproduction of Brazil nut in the forest (Nepstad et al. 1992). Some of these factors could be ameliorated through modified practices and research called for by Viana et al.

Post-Harvest Processing

While most of the potential improvements in harvesting techniques, storage and natural forest management practices are still under examination, one profitable method of increasing returns from existing Brazil nut harvests is post-harvest processing. Post-harvest processing of Brazil nuts yields several products. Brazil nuts are high in oil, 75% of which is unsaturated fatty acids that make the oil very attractive for cooking. Cooking oil is taken from the first pressing of the nuts while the second extraction can be used for soap-making and lamp fuel (Mori and Prance 1990). The factory in Xapuri currently presses and sells oil locally and plans to market the oil on a wider basis.⁶ At the factory and in the reserves, broken or rancid nuts are used as animal feed. Several women in the reserves make Brazil

⁶ In November, 1994, the CAEX charged US \$0.60/liter of Brazil nut while the price of a liter of soy oil (the most common cooking oil purchased by rubber tapper households) was US \$1.10. Brazil nut oil was available only in the CAEX's central store in town and not in the five supply outposts. The exchange rate for that month averaged US \$0.83 to Real \$1.00.

nut soap from the rancid nuts.⁷ Most of this soap is for home use and several families reported that they no longer have to purchase commercially produced soap for laundry and bathing. Sales of Brazil nut soap are increasing in Xapuri where the CAEX store regularly has Brazil nut soap on its shelves. The CAEX has been negotiating with the state Secretary of Education in an attempt to have ground Brazil nuts added to the flour used in the state-organized school lunch program. The CAEX also has been working with the Institute for Amazon Studies (IEA), a research and advocacy NGO, on a contract for a health food bar with Nutrimental, a large Brazilian food processor (Butler 1992).

The most lucrative market for Brazil nuts lies in whole nuts either shelled or in-shell. Richardson reports that all marketed nuts come from wild sources (Richardson 1995). Minor plantations exist in Kuala Lumpur and Ghana (Mori and Prance 1990), and one plantation has been established in the state of Amazonas but had not yet sold any of its nut production (Mori 1992). Brazil's national agricultural research agency, EMBRAPA has also established a Brazil nut plantation that has not yet been able to produce fruit (Karen Kainer, pers. comm.). This lack of economically successful plantations bodes well for continued investment in research and production improvements of native stands as there is no apparent imminent danger of substitution of wild Brazil nut production from cultivated sources.

Domestic consumption of Brazil nuts is very low and almost all of Brazil's production is exported to the U.S. and western Europe (Mori and Prance 1990). From 1980 to 1989, close to 95% of Brazil's national production was for export, with the U.S. ranked as the

⁷ The residue from pressing Brazil nuts can also be used for soap-making and animal feed (Mori and Prance 1990). In late 1994, an urban women's group in Xapuri was considering approaching the CAEX factory to propose a Brazil nut soap-making project.

number one importer of in-shell Brazil nuts. The U.K. ranks first in imports of shelled nuts. Of the shelled nuts exported to the U.S., 80% is in mixed nut products. Of the \$2.3 billion global nut trade, Brazil nuts captured 1.5% of the market (LaFleur 1992). The FOB value of shelled Brazil nut is usually twice that of in-shell nuts (Clement 1993).

Brazil nut production averaged 38,000 MT/year of in-shell nuts from 1980-1989 and reached a maximum of 50,000 MT in 1983. Since then, production fell steadily to just over 25,000 MT in 1989 (Richardson 1995). Harvest levels in 1991 and 1992 were 35,838 MT and 25,303 MT, respectively (IBGE 1994). During these two years, Acre's production of in-shell nuts exceeded that of the state of Pará, the perennial leader in Brazil nut production. Acre produced 14,630 MT in 1991 and 11,156 MT in 1992 compared to Pará's 9,456 MT and 10,962 MT for 1991 and 1992, respectively (IBGE 1994). Exports of shelled nuts from Acre totalled 187 MT in 1989 and 179 MT in 1990 (Estado do Acre 1991). According to the factory manager in Xapuri, CAEX exported 50 MT of shelled Brazil nuts in 1994.

Due to the heavy emphasis on exports, processing centers have been placed in major port cities, far from collection sites, resulting in high losses of 15-30% during transport from the forest to the processing centers (LaFleur 1992). Production has declined in the Marabá area in the eastern Amazon due to deforestation, rural-urban migration, flooding of *castanhais* and perhaps problems with pollination because of pasture establishment (Mori 1992). The resulting shift in harvesting from the eastern Amazon to the western states of Acre and Amazonas adds higher transport costs to these more remote western states which could undermine the capacity of Brazil nuts to compete in international markets (Anderson, Anthony B. 1992). However, employees at the CAEX were optimistic about the potential

to increase production for their operations through decentralized processing and through processing and marketing of different by-products as discussed above.

The Decentralized Brazil Nut Project of the CAEX

CAEX was the first agro-extractive cooperative formed by extractivist producers in the Amazon without external funding. Since its inception in 1988 with 34 founding members, CAEX had grown to over 200 members by December 1994. CAEX has its administrative offices in the town of Xapuri, as well as a dry goods store and the Brazil nut processing factory, through which it buys and sells rubber and Brazil nuts and produces Brazil nut oil. CAEX also has five supply posts in different *seringais* throughout the municipality, at which it buys rubber, Brazil nuts, and other products and sells dry goods. With financial assistance from various organizations over the years, CAEX has broadened its scope of operations from its original function as a collective buyer and seller of rubber. Grants and/or loans from organizations including Cultural Survival, the Inter-American Foundation, the Ford Foundation and World Wildlife Fund have assisted CAEX in its operations. The Canadian and Austrian governments have also provided assistance to CAEX.

The remainder of this chapter explores one facet of the CAEX's present activities, the decentralized processing of Brazil nuts in the extractive reserves. First I present an overview of the history of post-harvest processing by CAEX and the shift from centralized operations in an urban factory to an effort to decentralize this activity with rural labor. Then I examine specific questions related to the organization of the project. These questions include the ability of the project to efficiently decentralize post-harvest processing, to muster community

and household investment in the pilot phases of the project and to provide equitable employment for reserve residents.

Urban Decentralized Processing at the Chico Mendes Factory

In 1990, CAEX purchased an empty government warehouse in Xapuri and established the Chico Mendes Processing Factory to shell and dry Brazil nuts for national and international markets. For the next year and a half, the factory was the largest employer in town, with 140 employees and CAEX generated 60% of the tax income for Xapuri's municipal coffers (CNS et al. 1993). However, Brazil's employment legislation requires that all employers pay social benefits to full-time employees, benefits that cost employers almost as much as they already pay in salaries. Unable to meet these high labor costs in the face of competition from Bolivian nut processors who were not saddled with similar costs, CAEX switched to decentralized processing with home-based shelling of Brazil nuts in workers' home in the city of Xapuri. Under this arrangement, nut shellers who had previously worked during shifts at the factory were now paid for working at home on a piece-work basis.

As of November 1994, the factory had 92 people who worked at home as shellers, most of whom were women. The CAEX Vice President reported that there also were 30 full-time, salaried employees at the Brazil nut factory working in the drying, sorting and packaging stages. The processing operation consisted of pre- and post-shelling steps at the factory, with the shelling taking place in the shellers' homes. At the factory, in-shell nuts were placed in a metal warming bin for 12 hours in order to draw the nut away from the shell. The in-shell nuts were then soaked in water for five hours in order to soften the shell. CAEX then

delivered 3 *latas* (approximately 33 kgs of in-shell nuts) to the shellers, each of whom had a manual machine at home. Once the nuts were shelled, the home-based worker brought them to the factory the following day for weighing, final drying and sorting. Nuts were dried in ovens fired by fuelwood and Brazil nut shells. The shellers received a monthly paycheck based on their production. Nuts were sorted into three classifications, based on the size and condition of the nut. As of December, 1994, shellers received US\$0.30/kg for first class, shelled nuts, \$0.25/kg for second class and \$0.20/kg for third class.⁸

Decentralized Processing in the Extractive Reserves

In order to generate employment in the reserves, to increase the output of the factory, and to strengthen CAEX's economic viability by avoiding the high labor costs of full-time, urban employees, CAEX began a project of decentralized Brazil nut processing in 1991. The project has received financial backing from the Ford Foundation, the Inter-American Foundation and World Wildlife Fund. Technical assistance was provided by ECOTEC, a non-governmental organization based in Recife.

The project envisioned the establishment of mini-factories in the extractive reserve which would each employ 5-10 nut shellers. This original plan of operations has since expanded and there are now three arrangements for decentralized processing in the reserves. First, there are three community-level mini-factories in the reserves where all processing steps are carried out. These mini-factories each have from five to twelve nut shellers, a manager

⁸ For more on the factory and labor relations with urban shellers, see Anthony Anderson (1996); and Hecht et al. (1994).

and an assistant manager. Second, there are several families who live near one of the mini-factories and who take nuts home to be soaked and shelled and later delivered back to be dried in the oven at the mini-factory. These families are paid the same rate as the nut-shellers in the mini-factory, the only difference being that they work at home. Third, there are four household-level units where all of the processing steps are carried out at home. These families have constructed facilities similar to the mini-factories but that are scaled down for household-level production, each with between two and four nut crackers.

My household survey sample includes two of the three mini-factories and two of the four household-level units that were in operation in 1994. I was able to accompany these two mini-factories from pre-construction stages beginning in 1991 through several years of operation. Also included in my household study are three of the seven households participating in home-based shelling in conjunction with this mini-factory. This chapter relies on data from my household surveys and extended interviews as well as data from CAEX project records and interviews with CAEX and project staff. Project-wide information on production levels and salaries for all decentralized processing was available from the CAEX office for all those individuals who had worked on the decentralized Brazil nut project during 1993-1994.⁹ To complement this information, I applied a questionnaire regarding employee's attitudes and practices in the project. Using this questionnaire in Floresta and Cachoeira, I interviewed all of the employees in the two mini-factories and three of the four families who

⁹ Records for the 1992 season were lost in the CAEX computer when an employee inadvertently cleared the hard drive.

operated a household-level unit. The analyses of income levels and project performance are based on this project-wide CAEX data and these questionnaires.

The steps in the decentralized processing in the reserves are the same as those taken at the central factory, but the technologies are scaled down for community or household-level processing. First, the nuts are laid out onto a drying area, usually a raised wooden platform. Nuts are left to dry in the sun for one-three days. This has the same effect as in the factory where nuts are heated in order to pull the kernel away from the shell. Nuts are then soaked overnight in water to soften the shell. Breaking open the shell is the next step. This is done using a manual nut-cracker that is bolted to a table. The shell is gently cracked by hand with this machine and is then removed by prying it off with one's fingers or a small knife. Care is taken not to bruise the nut by pulling too hard on the nutcracker's weighted lever because a higher price is paid for whole, unbroken nuts.

Once the nuts are shelled, they are placed into a pile on the breakers' worktable. At the end of the day, shelled nuts are classified into piles of first, second and third quality nuts and each processor's production is weighed and recorded. Nuts are then placed on trays with wire bottoms and placed into the wood-fired oven for final drying, during which the humidity of the nuts must be reduced to 4%. Fuelwood is gathered from the nearby forest. Drying takes approximately 12 hours. Nuts are then placed into sealed plastic drums for transport into town. There the nuts will be sorted again according to industrial classifications (tiny, midget, medium, large, chipped, broken) and packaged for final shipping.¹⁰

¹⁰ For other technical and marketing aspects of the decentralized project, see Richardson (1995); Anthony Anderson (1996); Rebohle (1991); and Hecht et al. (1994).

At the end of the 1994 processing season, there were 37 people employed in the extractive reserves with the decentralized processing project. This includes the three pilot mini-factories, home-based shellers and the four household units. My household survey sample in the Floresta and Cachoeira areas encompassed 15 of these 37 persons, or 41% of those employed in the project. These 15 employees constituted 16% of the adult population in the two areas. By late 1994, the CAEX had already undertaken steps to construct additional mini-factories and there were many solicitations by CAEX members who wanted to build their own household units. The CAEX vice president estimated that, once a rotating capital fund was established from the monthly payments of existing units and mini-factories, CAEX could build 12 household units per year within the next two years. In 1994, decentralized processing accounted for 24% of the CAEX factory's total output of shelled nuts. The central factory manager hoped to increase this percentage to 50% in the coming years. Depending on CAEX administration of the decentralized project and the central factory, construction of additional mini-factories and household units, combined with improved processing and storage practices, should significantly increase the project's employment opportunities in the extractive reserves in the near future.

The three pilot mini-factories experienced some technological and personnel difficulties as the project got underway in the extractive reserves. While the positions of manager, assistant manager and most of the shelling retained a stable work force, there was a fairly high turnover rate as some reserve residents worked for a month or two as a sheller and later left the project. From 1993 to 1994, 26% of those who were employed in 1993

decided not to work at the project for the 1994 season.¹¹ This turnover rate fell to 10% in 1994 as four people decided to leave the project out of the total of 41 who were employed over the course of the season. All but one of the 17 people employed by the project in 1994 whom I interviewed planned to continue working in the 1995 season. Managers and project staff told me that there was constant demand for employment at the mini-factories.

The sex composition of the work force in the project remained fairly constant over the 1993 and 1994 seasons. In 1993, the work force consisted of 49% men and 51% women. The following year, men's participation accounted for 46% of the total work force while women accounted for 54% of the employees. As shown in Table 3.2, men and women shared different job categories in the project. Only one woman was employed in management, and only one man worked as a home-based sheller. This chapter will later show that there is no statistically significant difference in the income levels between these job categories. Thus, the job categories and the income within the project are fairly evenly distributed among the male and female employees.

In my household sample there were 15 people employed by the project in 1994 (i.e. those whose names were listed on the payroll). Their ages ranged from 15 to 55 with a median of 27 years of age. The 15 year old was a young man who had previously stopped attending school and chose to work on the project instead of tapping rubber on his family's *colocação*. In the household-level units and in the families who worked as home-based shellers, there were cases of eleven and twelve-year old children helping out with the

¹¹ Reasons for leaving the project had to do with health problems, job dissatisfaction and families moving from the area.

processing. Of the six children under 16 years of age who worked with their families on the project, three of these attended school in the morning and helped with shelling or some other task in the afternoon. The other three were 14 and 15 year old boys who had already passed third grade and chose to work on the project with their family. The project thus does not rely heavily on the labor of children, nor have families taken children out of school in order to work on the Brazil nut processing.¹²

¹² An evaluation team has argued that the project did result in children leaving schooling in order to shell Brazil nuts and that young children have taken over the task of nut-shelling once the adult women tired of this work. Their conclusions were based on very brief visits to two sites and differ significantly from my observations which were taken over the course of several years. See the concluding section of this chapter.

Table 3.2 Job Category and Sex Composition of the Work Force in the Brazil Nut Project (1994)

		Mini- Factory Sheller	Manager	Asst. Manager	Home- based Sheller ¹³	HH Unit Manager	Total
Men	#	11	2	3	1	2	19
	%	50%	66%	100%	22%	50%	46%
Women	#	11	1	0	8	2	22
	%	50%	33%	---	88%	50%	54%
Total	#	22	3	3	9	4	41
	%	100%	100%	100%	100%	100%	100%

Source: CAEX project records

Mini-Factories: community investment in increased productivity

The three mini-factories in operation at the end of 1994 each employed a site manager, an assistant manager and from five to ten nut shellers. Nut shellers worked a daily shift of 4 to 8 hours in the mini-factories. They were paid on a piece-work basis, similar to the rates paid to urban nut shellers. The decentralized rates were higher than those paid to urban shellers because of the lower operating costs of the decentralized mini-factories. The rural nut shellers were paid US\$399/kg of first class shelled nuts, \$299 for second class and \$.20

¹³ These data reflect the payroll sheets of CAEX. In many cases, the home-based shelling relies on the labor of several household members for transportation, sun-drying, soaking and shelling the nuts. This is often an activity in which most older children and adults in the household are involved. However, only the name of one person from the household is listed on the payroll.

for third class. Urban nut shellers received US\$0.30/kg for first class shelled nuts, \$0.25/kg for second class and \$0.20/kg for third class.

The mini-factory managers and assistants were responsible for sun-drying, soaking and oven-drying the nuts as well as keeping the shellers' tables supplied and weighing and recording all of the production. Their pay was based on the output of the mini-factory. The manager was paid US\$0.044/kg of all nuts produced by the unit. The assistant manager received US\$0.037/kg.

The site managers and assistants were responsible for processing steps which had to be maintained around the clock. There was a continual need to keep the nuts moving from the sun-drying tables to the soaking bin and then to the sheller's tables. From there, nuts had to be placed on racks in the oven for drying and then into barrels for transport to the CAEX for final packaging. The wood-burning ovens needed almost constant attention. One of the managers stated that gathering firewood was the most time-consuming task at their mini-factory. At another, soaking the nuts required the manager and the assistant to carry 220 liters of water every day from the nearest stream which was approximately 300 yards away. They expected to install a water pump provided by CAEX for the following season. The other mini-factory had a water wheel to bring water up to the soaking tank from a nearby pond.

The three mini-factories were constructed with communal labor and locally available wood. Other materials and equipment such as the nut crackers and some of the stove components were provided by the CAEX. Each mini-factory is obliged to reimburse the CAEX for the cost of these materials. This debt payment is made monthly by putting all of

the third quality nuts processed at the mini-factory towards the outstanding amount. Upon full payment, the mini-factory will belong to the community.

Extractive reserve residents have made communal investments to improve the infrastructure and productivity of the reserve through the mini-factories. Community members invested their time and labor in constructing the mini-factory, even though they had no written agreement that their families would have guaranteed access (i.e. employment) to the mini-factory. One way in which families could maintain some degree of control in the mini-factories was through continued membership in the CAEX and active participation in community meetings where some management issues of the factory were decided. Since the project was not donated to the community by the CAEX, it avoided many of the pitfalls of a welfare or *assistencialismo* approach which can make communities dependent beneficiaries as opposed to empowering participants who make their own decisions and investments regarding the project.

Home-based shelling with a mini-factory

The second arrangement for decentralized processing involves home-based shellers who work in conjunction with one of the mini-factories. Households involved in this arrangement lived from five minutes to an hour from the mini-factory. The choice to work at home was their own and was often made based on the more flexible work schedule with home-based shelling. For reasons described in this section, families realized that there were advantages and disadvantages to this arrangement. Those who lived farther away or who didn't have pack animals probably would have had higher returns to their labor if they had worked in the mini-factory. Others used the home-based shelling experience in their decision

to construct their own household unit. Those who lived closest to the mini-factory still preferred the home-based shelling.

Home-based nut shellers have somewhat higher incomes than those working in the mini-factory. This could be due to longer working hours or the assistance of other family members throughout the day so that the shelling machine rarely was idle. Although home-based shelling can yield higher returns per machine than in the mini-factory, it also requires more household labor in terms of transportation, drying and soaking tasks. Someone from these households has to go to the mini-factory to gather Brazil nuts from the central shed, take them home, lay them in the sun for at least one day and then soak them overnight. The soaked nuts then go to the breaking table on the porch of their house or in the front room for shelling. That same day, the shelled nuts have to be delivered back to the center for oven-drying.

The households that shell the nuts at home must make the same contributions to paying off the mini-factory construction costs as those who work at the factory itself, even though they also had to construct drying and shelling tables at home as well as make arrangements for soaking the nuts. A man involved in home-based shelling complained, "We basically have to do all the work except for the [oven] drying. But the manager and his assistant at the mini-factory still get the same cut from us even though we do almost all of their job". Another declared that he was frustrated at having to subsidize the construction payments of the mini-factory because he would not be able to realize a long-term benefit. Since he planned to move within the coming year, he felt that he had been investing fruitlessly

in the mini-factory. He said, pointing to the roof, "It's not like I can take that plank or that bench or that machine with me when I move, but I know that part of this place is mine".

Another drawback to this arrangement is transportation. One afternoon I met with a young man who had come to the mini-factory to gather nuts from the central shed to take to his *colocação*, an hour's walk away. As he had no pack animals, he had to rent the horses of a man who lived near the mini-factory. However, all three of the horses were out in the pasture, meaning that he would have to spend time to round up the horses and load the nuts, on top of having to pay the standard daily rate of US\$10 for the use of three animals.

Most of those involved in home-based shelling reported that this arrangement works best for households who have their own transportation and/or who live near enough to the mini-factory to be able to take advantage of the centralization by picking up already soaked nuts, thus avoiding the tasks of sun-drying and soaking the nuts at home. The time spent transporting the nuts and carrying out the other processing steps (aside from the shelling) is substantial for some households. Several households were trying out the home-based shelling for a season in order to decide whether they wanted to invest in an independent, household-level processing unit, which is the third decentralized arrangement.

Household-level units

This decentralized arrangement consists of household-level processing units where all steps of the processing are carried out at home. There were four such units in operation in December 1994 with several others soon to be constructed. As with the mini-factories, the CAEX offers to provide equipment and specialized labor for construction of the stove while

the family builds the drying tables, shelling facilities and covered area for the oven. The costs of these materials and hired labor must all be paid back to the CAEX by the household. In the same fashion as the mini-factories, monthly payments are deducted directly from the unit's production, in the value of 50 kg of first quality nuts (approximately US \$32.00) to cover construction and material costs.¹⁴

Based on labor availability, their cash on hand and the level of debt that they wish to incur, households may choose to have between two and four machines. The CAEX project manager estimated that average start-up costs for a two-sheller household unit were US \$700.00, but that corners could be cut to bring the cost down to approximately \$500.¹⁵ Depending on these costs and the market value per kg of Brazil nuts, he calculated that it would take approximately three years (based on a six-month processing season per year) for each household to pay its debt. The *colocação* would then have a significant value added to its infrastructure. This would increase the sale or exchange value if and when the household decided to sell or transfer its *colocação*. The units allow the households to add value to their primary products and increases labor opportunities for household members who otherwise might not have access to cash income.

¹⁴ The four households had no problems in making these monthly payments, which are deducted from their paychecks. In one instance, the CAEX honored a request by one of the households to refrain from taking the monthly deduction because of a tight cash flow. This flexibility and sensitivity to the realities of the economies of participating households made them more secure in taking on such a large debt with the CAEX.

¹⁵ Costs for some equipment such as a wheelbarrow, buckets for hauling water, soaking tanks, etc. could be avoided if the family already had similar items.

The CAEX paid US\$0.64/kg of nuts processed by the household units in 1994. This figure applied to Brazil nuts that the CAEX had already purchased from various gatherers during the harvest and had stored in the central shed near the mini-factory. When households that operate their own unit could harvest and process their own Brazil nuts, the CAEX paid US\$1.32/kg.

Of the four household-level units in operation in December 1994, two of them lay outside the extractive reserve boundaries. Although these did not have their land tenure guaranteed within the reserve, they had made a significant investment of their labor and future earnings in their *colocação*. These families were both very active in the Xapuri union and the CAEX and had participated in the *empates* responsible in part for the establishment of the reserves. Although they did not reside in the reserve, the families had a strong enough sense of security in their land rights as *posseiros* (squatters), and in the movement's ability to defend that tenure, that they were not inhibited from taking on the risk of investing in a Brazil nut processing unit.

Of the four families who worked as home-based shellers in 1993, three of them went on to construct their own household-level unit in 1994. Another couple that had worked at one of the mini-factories since the project began in 1991 also planned to build their own unit for 1995. One of the households that was working with home-based shelling in 1994 planned to do the same and construct their own unit for the 1995 season. Working with the project through one of the mini-factories gave these households a chance to evaluate their work preferences and the profitability of setting up their own household unit. Also, due to their many years of residence in the same *colocação*, they were very well aware of the harvest

levels of Brazil nut available to them. This information base and prior work experience put them in good stead for deciding whether or not to invest in a household-level unit.

An important criterion in deciding whether to invest in a household-level unit was the access that each household had to a minimal annual harvest of Brazil nuts. CAEX personnel reported that the CAEX requires households to have an average annual harvest of 600 *latas* (@ 6600 kg) in order to be eligible for a unit. They estimated that a harvest below this level would not warrant the CAEX's or the household's investment in the infrastructure. However, as was shown in Table 3.1, there were significant differences in the Brazil nut harvests between the Floresta and Cachoeira *seringais* in 1991 and 1994. According to the CAEX criteria in relation to the data in the table, none of the Floresta households could invest in a unit.

One of the families in my study had decided to invest in a household-level unit within the next year or two in conjunction with a decision to move their house farther into the forest and away from the larger, nucleated settlement in which they lived. Both the husband and wife had worked at the mini-factory since it was constructed in 1991, he as a manager and she as a nut sheller. Their situation would thus change from both the husband and wife being wage earners at the mini-factory to a more autonomous arrangement wherein they would operate their own processing unit. Their house was adjacent to the mini-factory and the central storage shed such that it was a frequent stopping-off point for people travelling into town or back into the *seringal*. The proposed location of their new house was only 20 minutes from their present home such that they would still be within a short distance of the mini-factory, school, CAEX store and relatives. Because of this constant traffic of visitors

and the demands placed upon them to feed and/or house these people, this couple had refrained from raising small livestock and cultivating fruit trees near their house. By deciding to move their house farther into the forest within their *colocação*, they chose to re-establish a more diversified productive base (with livestock and fruit trees), while increasing their autonomy in Brazil nut processing. Although the returns from their household-level unit for the first few years may not be as high as if they were both employed as wage earners at the mini-factory, their investment in the unit likely will yield them higher returns in the long run.

The other two couples in this situation (wherein both husband and wife were employed at a mini-factory) had made very different decisions regarding their relationship to wage labor and investment. Both of these households were in the Floresta *seringal*. For them, it was not an option to build a household level unit because their annual Brazil nut harvests were too low. The husband of one of these couples declared that he no longer wanted to work at the mini-factory. He stated that the work as manager was too time-consuming in relation to the salary. He planned to return to tapping rubber the following year. The third family planned to continue with both husband and wife working at the mini-factory, with the only change being that the husband planned to move up to take over the manager position which they hoped would be vacated by their neighbor.

Thus, the decision making strategy of evaluating the possibility of making a large capital investment in these cases involved criteria of personal work preferences, combined earning potential of male and female heads of household, the ability to weather a seasonal "hungry period", access to short-term credit and sufficient primary resources. This decision

also ties in with the household's longer-term perspective in terms of adding infrastructural value to their *colocação*, their land tenure and their expected length of residency.

Productivity And Income Levels Of The Decentralized Project

This section compares income levels of the different job categories in the decentralized project and differences in between the mini-factories. This is followed by an examination of project income levels compared to the national minimum wage. I conclude with a discussion of expected increases in productivity and income for the mini-factories and the household units.

Income Levels Between Job Categories

Table 3.3 shows the monthly income for each of the five decentralized processing job categories (sheller, home-based sheller, manager and assistant at the mini-factory, and household-level units) in 1993 and 1994. Comparing the income levels of those who worked with one of the mini-factories, an analysis of variance on the mean monthly and annual incomes showed no significant differences between the four job categories (sheller, manager, assistant and home-based sheller) in 1993 or 1994.¹⁶

¹⁶ ANOVA results: (1) monthly 1993 income: F ratio=1.2, p=.34 (2) annual 1993 income: F ratio=.05, p=.98 (3) monthly 1994 income: F ratio=1.17, p=.34 (4) annual 1994 income: F ratio=1.23, p=.31. Least squares difference test and Modified LSD (Bonferroni) test found no significant difference between any two groups at the .050 level for all four ANOVAs.

Comparisons between the monthly and annual income levels of the household units, shellers and home-based shellers for 1994 showed no statistically significant differences.¹⁷ The decentralized processing project has created employment opportunities in the extractive reserve which are equitable in terms of income levels. The project offers households and individuals various job categories from which they can choose depending on their work preferences, investment strategy, and access to primary resources. As was shown earlier in this chapter, men and women had access to all job categories in 1994.

¹⁷ t-test results: (1)mini-factory sheller compared to household unit: $t=1.05$, $df=24$, $p=.306$ (2)mini-factory sheller compared to home-based sheller: $t=.65$, $df=29$, $p=.519$ (3) home-based sheller compared to household unit: $t=1.35$, $df=11$, $p=.203$.

Table 3.3 Comparative Monthly Salaries of Different Job Categories in the Decentralized Processing Project (US\$)

	1993 mean monthly income	1993 total income	1994 mean monthly income	1994 total income
mini-factory sheller (n=11)	\$43.42 (n=11)	\$211.39 (n=11)	\$41.09 (n=22)	\$145.60 (n=22)
home-based sheller per machine ^a (n=3)	\$55.48 (n=3)	\$218.38 (n=3)	\$45.49 (n=9)	\$160.16 (n=9)
manager (n=3)	\$45.64 (n=3)	\$227.78 (n=3)	\$56.39 (n=3)	\$241.20 (n=3)
assistant manager (n=3)	\$38.61 (n=3)	\$193.22 (n=3)	\$50.70 (n=3)	\$216.07 (n=3)
household unit per machine ^d	----- (n=3)	----- (n=3)	\$32.27 ^b (n=4)	\$299.20 ^c (n=4)

Source: CAEX project records

- ^a Some households have two machines at home, but the paycheck is made out to only one person. Thus, their payroll income is not a measure of the returns to labor of just one person.
- ^b Household units have either two or four machines, the production from which is totalled on the payroll. Thus, the paycheck represents returns to labor for the whole household. In order to compare productivity per machine, I divided each unit's income by the number of machines in operation.
- ^c Total income per household for the year, irrespective of the number of machines in the unit.
- ^d Began full operations in 1994.

Comparing Brazil Nut Processing to the Minimum Wage

The basis for income comparison used by people in this study is the official minimum wage, a monthly income for full-time employment established by the federal government. In order to do such a comparison, I calculated the employees' average monthly income over the 1994 season. I then calculated the average monthly minimum wage for this same period of time. Finally, I divided the employees' average income by the average minimum wage to calculate their income as a percentage of the monthly minimum wage. The results are shown in Table 3.4.

Table 3.4 Comparison of 1994 Average Monthly Income with Official Minimum Wage

Job Category	Average monthly income as a percentage of the minimum wage		
	median	range	N
Household-level units (per shelling machine)	40.4%	32.0 - 47.6	4
Sheller in mini-factory	52.3%	9.4 - 89.5	22
Home-based sheller	51.6%	29.7 - 1.03	9
Assistant Manager	64.8%	49.5 - 74.7	3
Manager	75.8%	58.4 - 76.1	3
Household-level units (per unit)	95.0%	63.9 - 1.34	4

Source: CAEX project records for income levels. For official minimum wage, IBGE (1994).

The highest potential earnings per individual were in the category of nut sheller in the factory. In this job, one's income relies on one's productivity.¹⁸ The individual with the highest average monthly income over the 1994 season was a home-based sheller. Her house was just a few minutes walk from the mini-factory so that she and her family had only to gather already pre-dried and soaked nuts, without having to do these steps at home as other home-based shellers did. The individual with the second highest average monthly income in 1994 was a mini-factory manager. Although the project did pay a full minimum wage for any of the job categories, the last section of this chapter discusses expected increases in productivity which could raise income levels significantly.

Comparisons Between Mini-Factories

The nut shellers employed at the Floresta mini-factory earned more than those at the other two mini-factories and more than those who worked as home-based shellers. Since income is tied directly to productivity (workers are paid per kg of nuts processed), Floresta was the most productive mini-factory in 1994. As was discussed earlier, production at this mini-factory was limited due to a small oven. The average Floresta income relative to the other mini-factories could go even higher next season after the oven is expanded.

The higher Floresta productivity is also important because Floresta has been touted by the CAEX project manager as the most typical of the three mini-factories in terms of accessibility, labor availability, social organization and Brazil nut production. The other two

¹⁸ An exception to this was in the Floresta mini-factory, where production had to be stopped early every day once the oven racks had been filled with shelled nuts.

factories, which are accessible by road and have benefitted from different projects and movement activities over the years, are less typical extractive reserve areas. This bodes well for reproducing the decentralized mini-factories in other areas of the reserves that may not have been considered good candidates for such a project. The lower income levels in general for Floresta in 1993 can be attributed to that being the first season of operations when personnel were not yet familiar with the work and when the mini-factory's installations were still being modified.

Expected Productivity and Income Changes

Although the last line in Table 3.4 shows that the household units have a higher typical monthly income compared to the jobs at the mini-factories, this figure is the result of at least two people's labor. Dividing the unit's income by the number of nut shelling machines that it has, shows the income per machine, which can be directly compared to that of the mini-factory shellers. The resulting figure, US\$32.27 per month during the 1994 season, or 40.4% of a minimum salary, is quite a bit lower than those of the mini-factory employees for several reasons.

First, those operating household units have to carry out all the other processing steps (sun-drying, soaking and over-drying), whereas mini-factory shellers only have to shell the nuts that are brought to their work table. Thus, the output per machine at the household unit represents a higher labor investment than that of a mini-factory machine. Second, a monthly payment of approximately US\$30 is deducted from each unit's income as repayment for CAEX construction costs. Thirdly, 1994 was the first year that these units were in full operation. Records from earlier project years showed that productivity increased notably

after employees had been working for several months and had improved their skill and quickness in shelling and other steps in the decentralized processing. It stands to reason that the household units will also experience such improvements over the coming seasons. Third, because the units are a new endeavor, there are still technological improvements which could be made including oven construction, unit design and water hauling systems.

Most importantly, future increases in income for the household-level units are expected in relation to the source of the nuts that they process. In the 1994 season, the household-level units were paid US\$0.64/kg for processing nuts that the CAEX had previously purchased from various families in the reserve and had stored in the central shed near the mini-factory. In effect, CAEX paid double for these nuts, once in the original purchase from the harvesters and again for processing. In future years, families operating the household-level processing units hope to be able to gather the Brazil nuts in their forest tract and, instead of selling them immediately to the CAEX, they would store these nuts for later processing at their unit once the rains let up. The price paid for this processing was US \$1.34/kg in 1994. Thus, these households will be adding value to their own primary product and will receive an even higher payment per kilo of nut from the CAEX.

In terms of labor relations, this will shift them from their current status as piece-rate wage workers to more autonomous commodity marketers. They will thus rely on a traditional forest product in their *colocação* but will be able to add value at home, retaining control of the whole process and producing a high quality commodity for international export markets. The investment that these households have made in processing units reflects their evaluation of their opportunity costs. Instead of earning more cash income by working as a

sheller at a mini-factory, they have decided to take on significant debt and invest their labor in a more autonomous production system. This enables them to realize higher returns in the future and to increase the long-term value of their forest holding.

The primary difficulty in this shift lies in the ability of these households to go without income from their Brazil nut harvest for several months. One family had hoped to be able to weather this "hungry period" prior to the 1994 season but found that they had to sell their Brazil nut harvest to the CAEX for needed cash to carry them through to the beginning of the processing season. This difficulty could be partly avoided by having more than one household member join the CAEX. Each CAEX member is allowed to make purchases of dry goods on credit at the CAEX stores up to 50% of their initial quota dues, or approximately US\$45.00. This amount of additional credit could see a typical household through another month of purchases.¹⁹ Household members in two of the three families operating a household-level processing unit shared with me their plans to join the CAEX, indicating that this possibility of extended credit is a realistic one.

The CAEX hopes that families will take greater care in harvesting and handling the primary product when they will be the sole recipients of any value added. While the CAEX has experienced losses due to nuts being held in wet storage conditions for extended periods, the Vice President indicated that families with household-level units will work to reduce such losses in order to increase their own income. The CAEX factory manager indicated that he hoped to see productivity increase at the household level units to yield 4 kg of shelled

¹⁹ The average monthly expenses for dry goods of the households surveyed was US\$57.65/month.

nuts/*lata*. Current yields are roughly 3.5 kg/*lata* at the decentralized mini-factories and 3.1 kg/*lata* at the central factory.

To provide an estimate of the expected increases in income due to processing their own Brazil nuts, I calculated the income in three different scenarios for a typical household in Cachoeira. Using an average harvest of 600 *latas*, direct sales of in-shell nuts to the CAEX would yield approximately US \$1,266 based on an average price of \$2.11/*lata* paid by CAEX in March, 1994. Operating a household unit and processing the full harvest of 600 *latas* for sale to CAEX at \$1.34/kg would yield a gross income of \$3,216 for the season.²⁰ Taking out the monthly deductions of \$67/month for repayment to CAEX of construction costs leaves a net income of \$2,814 for the season.²¹ This is 222% higher than the same household would earn by selling their harvest without any value added.

Conclusions

These investments show that CAEX members and other reserve residents are sufficiently confident of the CAEX's ability to administer the decentralized project and the larger co-operative and factory operations to warrant their investment. The ability of local associations to meet the marketing needs of small producer communities over time is essential for the empowerment and stability of these producers and for sustainable management of the resources upon which they depend.

²⁰ This calculation is based on 600 *latas* x 4kg/*lata* x \$1.34/kg.

²¹ This monthly deduction is based on 50kg x \$1.34/kg.

The mini-factories and household units provide a form of wage labor in the *seringal* that complements the traditional livelihood strategy of small-scale producers with combined subsistence and market production from a variety of activities. All of the households in the project continue to raise their own crops for home consumption and surplus marketing such that wage work has not reduced the autonomous subsistence production of participating families. There is strong potential for extractive reserve households to increase both production levels and productivity rates in community and household enterprises without putting additional pressure on the resource base. Households and communities were willing to take on a significant amount of debt in order to realize improvements in their production capacity.

Work in the mini-factories and home-based shelling was found to be attractive to families and individuals in various stages of the life cycle. Women with young children often preferred to work as a home-based sheller. Larger families with older children have invested in autonomous enterprises via the household-level units in order to add value to their own cash crops, to provide a form of wage labor for family members who otherwise would have no cash income and to increase the value of their forest holding. Three young couples with children in this study found it profitable to hire a neighbor or relative for child care while both husband and wife worked at a mini-factory. Many single young men opted for piece-work in the mini-factories because it paid more than they could earn through tapping rubber.

The project does not appear to have significantly altered the character of the community in terms of social relations. Households have retained their autonomous resource management systems within the larger common property regime of the reserves. Social

differentiation due to the project has occurred in the form of two families hiring an individual for child care. Several families involved in the project have hired day laborers for agricultural or land-clearing tasks, a traditional practice that preceded the establishment of the project. There is a perception of favoritism and dominance by certain extended families in the decision-making process of where to locate the pilot projects and in the selection of employees at the mini-factories. However, my analysis of kinship relations and project personnel showed that there is no statistically significant weight behind these comments.²²

As will be seen in more detail in Chapter 4, the relationship of the rubber tappers to their resource base has changed significantly, in large part due to the opportunities provided by the Brazil nut project. With young men increasingly seeking employment in the mini-factories or in other activities, the prevalence of rubber tapping as a way of life is waning in some parts of the reserves. This changes the social identity of rubber tappers and alters the human-nature interactions from those traditionally practiced in the reserves. As young men refrain from tapping rubber, it is possible that their observations and knowledge of the forest ecology could diminish. Rubber tapping requires daily, extended trips in the forest. Working as a nut sheller requires much less daily interaction with the forest and forest management practices.²³

²² Those households which have at least one member employed by the project have a higher incidence of being related to the project manager's household than those who are not employed by the project. However, there was no statistically significant dependence between a household's relationship with the manager and that household's employment in the project.

²³ I am grateful to Karen Kainer for this observation.

CHAPTER 4

DECENTRALIZED BRAZIL NUT PROCESSING AND THE RUBBER TAPPER HOUSEHOLD ECONOMY

The decentralized Brazil nut processing project has created new livelihood options for participating households based on wage labor in the mini-factories or a more autonomous arrangement of piece-work in household level units. These new productive arrangements have involved significant investment by peasant producers at both community and household levels, and appear to have good potential to increase productivity and income for participants. The *colocação* and the *caboclo* household have changed significantly with the introduction of this project. Here I examine what these changes signify in terms of a new type of household economy that is emerging in the extractive reserves.

Within the *seringal*, this new initiative of decentralized processing is only one of a variety of household and individual livelihood strategies being practiced. Household strategies range from reliance upon the more traditional relationship with a boss or trader, to families involved in co-operative marketing and unionized activities, to households invested in more autonomous production or wage labor with the Brazil nut project and other wage employment. Individual strategies range from teenagers and young adults in wage employment who may pool none or all of their income with their families to single young men who rely solely on share-cropping relationships and wage labor in the *seringal*.

There has been a significant change in the major income sources for the residents, both households and individuals, in this study's two extractive reserves. Instead of relying on the extraction of rubber and Brazil nuts for most of their cash income, wage labor and state service payments such as agricultural retirement and pensions are increasingly important to the livelihood of reserve residents. The original model of the extractive reserve presumes that households would be able to rely on traditional activities of agriculture and extraction for a sustainable livelihood. While the households in this study continue to practice a combination of these practices, the increased reliance on wage labor may not have been anticipated by those who first laid out the extractive reserve concept. This does not mean, however, that this new type of household economy is incompatible with the extractive reserve model. To the contrary, current interpretations of the extractive reserve see it as an evolving model, defining itself differently according to local socioeconomic, political and biological conditions (CNS 1992a).

With the introduction of the Brazil nut project in the context of community construction and transformation in the extractive reserves, individuals and households are defining new economic roles and trends. As wage labor increases due to the project and other community initiatives, will people choose to abandon traditional subsistence or market-oriented practices? What will such changes mean for labor allocation decisions within the household? Will hiring practices within the reserves result in socio-economic differentiation? The intra-household distribution of resources could also change significantly as individuals choose to control their own income from wage employment. What effect does this have on pooling household income from traditional sources? I explore these questions in this chapter

and argue that the decentralized Brazil nut processing project has changed (and will continue to change) household economies, labor relations and intra-household allocation of resources. These changes signify a break with patriarchal family systems and the accommodation of new forms of income-generation in which women and young people have new possibilities for autonomy and definition of different livelihood options within the extractive reserve.

Chapter 3 relied on project-wide data of the decentralized Brazil nut project complemented by additional questionnaires on employees' perceptions of the project. In this chapter, I explore the project within the context of household livelihood strategies in the extractive reserves. For this, I draw upon household-level surveys that I conducted with 28 households in 1991 and 1994 in the Floresta and Cachoeira *seringais*.¹ Of the households interviewed in 1994, 48% of them had at least one family member employed by the Brazil nut project in 1994. I relate this household survey data in combination with extended interviews conducted with project personnel and union and CAEX leaders, both in the reserves and in town.

The Decline of Rubber Tapping in the Study Area

The goal of the extractive reserves is in part to provide for the self-sustainability of the reserves' residents through a combination of subsistence and market activities. While latex extraction traditionally has been one of the primary sources of cash income in the *seringal*, rubber declined dramatically as a source of cash income for the surveyed households over the

¹ Three of these 28 families migrated from the study area, leaving 25 households in my 1994 sample.

three years of this study. However, access to the rubber trees did not change over this time. In fact, the establishment of the extractive reserve secured access to and control over this resource. What did change was the relative importance of rubber within the household economy. This decline was such that some households no longer engaged in this activity while others did so only out of sheer necessity. They stated that they had no option but to extract latex, even though the returns to their labor were quite low.

In 1991, the average number of rubber trails that were regularly tapped per household in my survey sample was 3.7, ranging from zero to eight for the 16 households that responded. This number fell to 2.5 trails in 1994 (range: 0-5; N=23), a decrease of 32%. Looking at the number of trails that the households chose to exploit, in comparison to the total number of trails that they controlled, reveals another important dimension to the decrease in this extractive activity. In the Floresta *seringal*, households regularly tapped an average of 76% of the trails on their *colocação* (n=15). In 1994, this percentage fell to 43%, leaving over half of the rubber trails in this area untapped. By contrast, the percentage of trails being tapped in Cachoeira in 1994 was 86%. This difference is due to the changing relative value of latex extraction in comparison to other traditional practices, differences in labor relations between the two areas and newer income sources.

Prices paid to rubber tappers for wild rubber in Brazil have fallen dramatically in the past few years, in part due to the increased production of plantation rubber elsewhere in Brazil and in part due to a lack of federal tax resources directed towards improving extractive

practices.² As a result, its ability to serve as a profitable, or even worthwhile, source of cash income has also plummeted. Schwartzman reports that the state-controlled prices of native Amazonian rubber averaged US \$2.00/kg for 1980 to 1984 (Schwartzman 1989).³ Prices paid to rubber tappers by the CAEX ranged from US \$.79/kg in 1988 (Campbell 1990)⁴ to \$.77/kg in 1991 and \$.88/kg in 1994.⁵

When prices reached an all-time low in March 1991, the CNS organized demonstrations in Brasília by rubber tappers to pressure federal officials for improved price supports for native rubber (Butler 1992). The CNS strategy calls for 30-year subsidies in rubber prices to Amazonian extractivists and the promotion of improved processing techniques (CNS et al. 1993). A conference held in 1991 to define economic alternatives for extractive reserves concluded in part that "rubber is the basis of sustainability in the Reserves

² Mary Allegretti (1994) points out that only 1.22% of the TORMB (a federal import tax on rubber) was directed towards improvements in native latex extraction. Also see Stephen Schwartzman for the relationship between the TORMB and policies of subsidies of other economic sectors (1989).

³ Although a good part of these prices were most likely absorbed by middlemen, they indicate that the base prices were generally quite higher than those seen in Xapuri in the late 1980s and early 1990s.

⁴ Price paid by CAEX in July 1988, the month that CAEX was founded. Prices paid by other merchants that same month averaged US\$.66/kg (Campbell 1990). Although the CAEX has been able to somewhat ameliorate low rubber prices for its members, rubber tappers in the CAEX have by no means been isolated from the falling market value for native rubber.

⁵ Rubber prices are reported in US dollar values for the respective years (1988, 1991 and 1994) and are therefore not "constant" dollar values. Due to inflation and three turnovers in the Brazilian currency (either deflationary measures or the issuance of new currency) over this period, the decline in rubber prices is even much more significant than reflected by the US prices.

in the short-term, and prices should be in harmony with the function of forest protection being fulfilled" (Allegretti 1995, p. 170). As a result, advocates of the extractive reserves have called for subsidy payments to be made directly to rubber tappers in recompense for the environmental service they provide by residing in and protecting the forest (Allegretti 1995).⁶ Allegretti calls for a price of US\$2.82/kg which "would provide an adequate income to the rubber tapper, encouraging him to remain in the forest. . .[and which] would not be more than US\$42 million, an insignificant value if compared to what the State spends on incentive for activities that are not sustaining the Amazon" (Allegretti 1995, p. 169).

As the price currently stands, however, extractive reserve residents in this study are evaluating the relative value of latex extraction in comparison to other income sources. Rubber is falling low on the list of preferred livelihood strategies. Their evaluation is made in large part on the market value of rubber, but it is also related to the social value and comparative working conditions of tapping rubber. The declining importance of rubber has to do with the future economic viability of their extractive reserves as well as with their very identity as "rubber tappers". As rubber tappers weigh the opportunity costs of continued extraction of latex versus investment in newer technologies and productive activities, they transform their economy and social organization.

The *colocação* is a site of multiple income-generating activities, multiple class relations and subsequent social identities as household members make a living as rubber

⁶ This position was also taken by Manuela Carneiro da Cunha, a professor of anthropology at the University of Chicago and the University of Sao Paulo during her presentation "Can Traditional People Manage Conservation Areas? An Account of the Jurua Experience--Acre, Brazil", given 11/29/95 at the University of Florida.

tappers, teachers, nut shellers, community agents or CAEX employees. These newer income sources for different gender and age groups from wage labor and other activities are changing intra-household resource allocation. The traditional model wherein the male head of household supplied and controlled all income sources and market transactions is fading away (Safa 1995). Thus, calls to provide subsidy payments to the male head of household for continued involvement in a traditional practice that is no longer perceived as economically or culturally valuable may not be the most effective means of securing the success of the extractive reserves within the biological and socioeconomic context of the two reserves in this study.

The practice of extracting traditional non-timber forest products such as rubber and Brazil nuts is not a reliable source of income for some households in the extractive reserve. My data show that dependence on rubber has declined drastically in recent years. In 1991, rubber accounted for an average of 45% of the cash income of the surveyed households (range: 0-100; median=36; n=23). By 1994, this number had fallen to 17% of total cash income (range:0-100; median=5; n=21). In 1991, two of the 23 households (8.9%) had no income from latex extraction. By 1994, six out of 21 households (28.6%) had chosen not to tap rubber.

In 1994 I asked the surveyed households whether or not they thought that people in the reserves would still depend on rubber and Brazil nuts for most of their income ten years from the present. Ten of the 13 households (77%) answered in the affirmative. Only one household (8%) thought that these products would not be significant sources of income in the

future (replying that families would increasingly rely on sales of agricultural crops) and two households (15%) were not sure.

However, in 1991 and 1994, I asked the households in my survey if they planned to continue tapping rubber. The responses are shown in Figures 4.1 and 4.2. In 1991 only 8.4% of the households indicated that they would not invest family labor in tapping rubber. The 1994 responses are quite different: a combined total of 26% responded that rubber tapping was not a worthy investment of household labor resources. Households are changing their outlook on traditional practices as they weigh changes in the relative worth of rubber extraction.

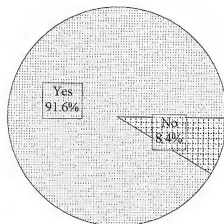


Figure 4.1 Responses in 1991 to the Question: Do You Plan to Continue Tapping Rubber?

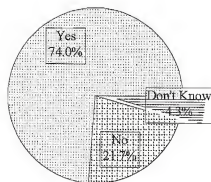


Figure 4.2 Responses in 1994 to the Question: Do You Plan to Continue Tapping Rubber?

One of the many conversations that I had on this topic was with Sebastião, a young man who works at the Brazil nut factory in Xapuri and whose family is part of my household survey in the Floresta *seringal*. Sebastião told me that his family continues to tap rubber only because they have the labor available (he has two teenage brothers) and they need what little money it does bring in. He explained that one of his brothers could gather an average of four kgs of rubber per day on the three trails in his family's *colocação*. Working 20 days/month on the trails would yield 80 kg for the month.⁷ At the current price of Reais \$0.87/kg, total monthly income would be Reais \$69.60 for the month.⁸ He declared,

That's not even equal to one minimum salary. The rubber tapper just wastes his energy; it never will be worth his time. He doesn't eat well, he spends the entire day

⁷ This is a rather high estimate of monthly rubber production. During the drier months of August and September, harvests might go as low as 45-60kg/month.

⁸ The exchange rate for the Brazilian *real* for that month (October 1994) was US\$1.00 = \$0.84 reais.

walking in the forest and doesn't even make enough to buy the dry goods that he needs. He cuts rubber because he has no alternative.

While the economic returns from rubber have fallen in recent years and despite Sebastião's lamentations about the physical difficulties of tapping rubber, his own calculations point out an important difference between the perceived and actual value of rubber tapping. Sebastião calculated that his brother could earn only Reais\$69.60/month tapping rubber, "not even a minimum wage", he argued. Yet, the official minimum wage for that month (October 1994) was \$70.00 Reais (IBGE 1994).

Changing perceptions of the relative values of different activities are the key to understanding the various criteria used in deciding whether or not tapping rubber is a worthwhile use of one's time. In 1991, an older man told me tongue in cheek, "Years ago, I got tired of walking the trails and earning five salaries a month from rubber. Today, it's not worth it at all". Rubber's value today, even as a subsistence activity, pales so in comparison to the highly valued product that it once was, such that the returns to labor from rubber today are valued even less.

This is especially so when comparing rubber extraction with other labor options. Sebastião has another teenage brother who works as a nut sheller in the nearby mini-factory. He earns a monthly average of R\$69.68. His job entails a 40 minute-walk through the forest to the *colocação* where the factory is located, a seven to nine hour shift of shelling nuts and the walk back home again. The work itself is not physically exhausting; one sits at a table and manually cracks nuts one at a time. For some, the atmosphere is more pleasant; there is plenty of social interaction, conversation and gossip with fellow workers. Compared to the much

more arduous and solitary work of rubber tapping (which involves walking for two to four hours to tap the rubber trees, another round trip back again to collect the latex and then the smoking and processing in the late afternoon) Brazil nut shelling is easier work, although the income returns are not different.

The returns to labor are identical: R\$69.60 for rubber tapping, R\$70.00 minimum wage and R\$69.68 for Brazil nut shelling. Rubber was strongly condemned by Sebastião as not being worthy of one's time and energy even though the economic returns from this activity were reasonable compared to the other employment option available.

Sebastião's estimate of monthly rubber production is quite a bit higher than those of neighboring households who estimated their monthly production to be between 45-60 kgs. These harvesting levels would yield only R\$39.00-\$52.20, returns which are well below the minimum wage of R\$70.00. In these cases, Sebastião's argument holds on economic calculations but may not be appropriate for his neighbors, depending on their labor availability, attitudes toward latex and other opportunities.

Still, the overarching impression towards tapping rubber that the surveyed households conveyed was one of disappointment. For many, rubber tapping had become a necessary evil. Many of them referred to tapping rubber with disparaging comments about how physically exhausting it was, how they were too tired to tap rubber anymore, or how it had lost its social and economic importance. This shift in attitudes is important for their extractive reserves and reflects a changing cultural identity within the *seringal*. Just as gender roles within the extractive reserves and within the rubber tappers' social movement are debunking the popular image of the lone *seringueiro* as the defender of the rainforest (Campbell, forthcoming), so

too are changing livelihood strategies changing the reality and the image of who is a *seringueiro*.

During my field research in 1991 and in 1994, I talked at length with several families about the implications for the social identity of the *seringueiro* and the extractive reserve if very few households are engaged in rubber extraction. When bidding farewell to one family in 1991, whom I had known well for years, the husband proposed a swap of my pocketknife for his rubber tapping knife. While this young man, a cousin of Chico Mendes, went into the other room to get his knife, a neighbor who was present kidded him about how infrequently he tapped rubber. "You better wipe the rust off that knife. If she shows that to people at home, they'll think that Chico's family stopped being rubber tappers altogether!". A similar scene was replayed in 1994 while talking with another family about the value of rubber tapping as a livelihood. The husband of this family laughed and said, "I always carry around a tapping knife in my bag . . . just to show the visitors". When talking about the future of the *seringueiro* way of life and whether it was disappearing, another young man shrugged his shoulders and replied, "*Someone* will always tap rubber", but that someone would not be him or his children.

The CNS has called for market subsidies for rubber and for technical assistance to improve the processing of latex into the *placa bruta defumada* and the *folha fumada*, rubber products that are higher in quality and which could demand a much higher market price. It remains to be seen whether or not households' perceptions and practices regarding latex extraction will change if these processing and/or pricing changes are instituted. For now, the attitudes of the households that I surveyed regarding their future involvement in rubber

tapping reflect a growing disinclination to allocate labor to this activity if there are other options available. When no other options present themselves, the attitude is one of resignation. Tapping rubber is seen as a last resort.

Figures 4.3 and 4.4 present the responses of parents in the surveyed households when we discussed whether or not they wanted their children to tap rubber, or to be *seringueiros*. As with their outlook on the future of rubber in 1991 and 1994, these responses show that more people are now willing to rule out rubber tapping as a future for their children as a production strategy and as a way of life. Most of the parents who told me that they did not want their children to grow up to be rubber tappers immediately followed their answer by saying, "I'd rather that they study" or, "There's no future in rubber".

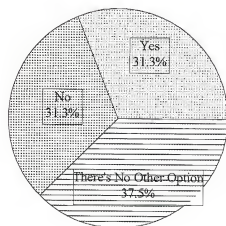


Figure 4.3 Responses in 1991 to the Question: "Do you want your children to be rubber tappers?" (N=16)

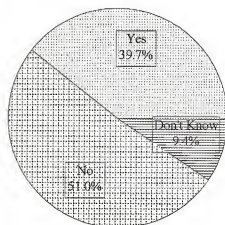


Figure 4.4 Responses in 1994 to the Question: "Do you want your children to be rubber tappers?" (N=17)

When I asked the families in the 1994 interviews whether or not the current market price of rubber compensated for the time and energy needed to walk the trails and process the latex, over half of the households gave a negative response. As the above cases illustrate, there are various criteria that go into making such a judgement about the present relative value of rubber as a productive activity. Even though the calculations of specific monetary values in some families favor the extraction of latex as a profitable endeavor, other families have different opportunities which disfavor rubber as a worthwhile use of the household's labor resources.

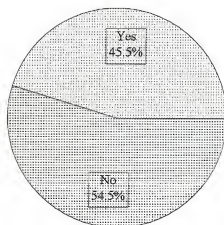


Figure 4.5 Responses in 1994 to the Question: "Is the money that you make tapping rubber worth the time and energy that it takes?" (N=22)

Some households and communities in the extractive reserves have decided that investment in the Brazil nut projects provides a more profitable return to their labor and to their future earnings than tapping rubber, as it is currently practiced. By taking on new debt and hiring outside labor in order to access new wage employment opportunities, several households in this study go beyond subsistence income strategies. Their construction of a new economy within the extractive reserve represents an important shift in ideology and practice that signals strong confidence in the larger extractive reserve model. This model calls not for "immobilization" but rather for modification of the existing extractive base, such that "extractive activities can be the point of departure for a reordering of the regional economy" (Allegretti 1995, p. 165). Secure land tenure within the reserves and sociopolitical organizations for cooperative marketing and political lobbying provide a structural environment in which reserve residents are willing to experiment with new technologies that may alter their relationship to certain resource management practices while providing a more

diversified income base. While some reserve residents may not be "rubber tappers" or *seringueiros* in the traditional sense, they retain their ideological and concrete relationship with the forest in a transforming economy.

Transforming Livelihood Strategies

This section focuses on the relative economic returns from the various activities in which households and individuals are engaged. In order to see the impact of the Brazil nut project and the role of the CAEX in changing economic conditions of extractive reserve residents, and to see shifting strategies in decision-making and community construction within the *seringal*, I divided the household sample into three groups. These three groups are based on the households' employment in the Brazil nut project and on membership in the CAEX.

The first group consists of those households in which the male and/or female head of household was employed by the Brazil nut project in 1994, either at one of the mini-factories or in a household-level unit. As will be discussed later, income earned by adolescents or young adults in the project generally was not pooled within the household. For this reason, I considered as household participants in the project only those families in which the husband and/or the wife were employed. The second group of households consists of those who were members of the CAEX as of 1994⁹, but which were not employed by the project. The third group consists of those households which were not involved in the project or the CAEX.

⁹ In all cases of CAEX membership in my sample, the male head of household was the sole CAEX member. All of those families that were CAEX members in 1994 were also members in 1991.

As will be explored throughout this chapter, these three household groupings represent significant and ongoing socioeconomic changes in the extractive reserves in this study. Household economies are being transformed as income from wage labor, state service payments or autonomous enterprises related to the Brazil nut project becomes increasingly important relative to traditional extractive activities. The three groupings in this section represent these changes.

The third group is akin to the rubber tapper household prior to the advent of the social movement. They rely on a boss or trader for marketing because they are not members of CAEX. Although they live in the reserve, their lack of access to services is reminiscent of life in the *centro* of the *seringal*, far removed from the activities and benefits provided by the boss at the *margem*. The second group, CAEX members, benefits from the newly constructed community and transformed economy in the reserves. Access to schools, health post, CAEX supply posts and the CAEX transportation services are important shifts in the rubber tapper household and its relations within and beyond the *seringal*.

The first group consists of those households involved in the Brazil nut project. They represent an even more stabilized household economy with access to all of the services and social ties of the second group. A few have gained access to additional services, such as urban schools for their children. They have increased their economic autonomy by establishing household units or community-level mini-factories. This investment in their *colocação*, their community and their co-operative marketing organization are indicative of a stronger confidence in the ability of the extractive reserves to provide secure and worthwhile income over the long-term. This transformation in household economies is a

result of the construction of a new type of community within the rubber tappers' social movement.

Table 4.1 Comparative Mean Household Income Levels 1991-1994

	Mean Total Net Income (US\$)	
	1991	1994
Project HH's	\$737.95 (N=8)	\$1503.67 (N=9)
CAEX, non-project	\$979.12 (N=8)	\$1051.43 (N=7)
Non-CAEX, non-project	\$404.34 (N=5)	\$866.48 (N=4)

Table 4.1 shows net total household income in 1991 and 1994 of those households that went on to become Brazil nut project participants in 1994, those that were members of the CAEX, and those that participated neither in the CAEX nor in the project. While there is some variation among the 1991 income levels of these three groups of households, an analysis of variance found no significant difference in the mean incomes ($F= .2229$; $p = .80$) using both the least significant difference test (LSD) and the Bonferroni test, which is more sensitive to the number of observations made. I did not expect any significant differences among the three groups in 1991 because the Brazil nut project had not yet begun. The differences that are shown in Table 4.1 have to do with CAEX membership but were not statistically significant.

An analysis of variance of the 1994 mean incomes of these three household groups does, however, show a significant difference between two of them ($F=2.65$; $p=.09$). The LSD test results suggest that those households in which the male and/or female head of household were employed in the project in 1994 (row one of Table 4.1) had a significantly higher mean income than those households which were not CAEX members and were not employed by the project (row three of Table 4.1). This would indicate that this household group, which I consider to be more stabilized and invested in the reserve model, had significantly higher income levels in 1994 than the group which I consider to represent the more traditional rubber tapper household. The more sensitive Bonferroni test, however, did not find a significant difference between any of these three groups. This finding (or lack thereof) is most likely due to the small sample size which was been further accentuated by splitting it into three groups.

Table 4.2 shows the changes in composition of income between the households that were part of the Brazil nut project and those that were not. The analyses of variance of these households show that significant differences in the 1994 income levels can be attributed to the Brazil nut project.

Table 4.2 Relative Contribution of Productive Activities to Household Income 1991-1994 (US\$)

	Crops	Non-Timber Forest Products		Brazil Nut Project (male &/or female head of household)
		Rubber	Brazil Nuts	
1991 mean income	\$120.22	\$291.93	\$334.25	-----
range (N)	0-1033.50 (26)	0-924 (23)	0-2028 (25)	
1994 mean income	\$35.88	\$93.25	\$400.20	\$361.27
range (N)	0-260.30 (22)	0-264 (21)	0-1730 (21)	127.10-531.70 (9)

Source: field interviews by the author in 1991 and 1994

For the nine households in which the male and/or female head of household worked in the project in 1994, there was a significant increase from 1991 in the average income of this group. This is shown in Table 4.3 with the results of the t-test for paired samples.

Table 4.3 Comparing 1991-1994 Income of Project Households

	1991	1994
Average income (US\$)	\$ 656	\$1363
Average difference (US\$)	\$707	
t-test for paired samples	t=1.89	df=8 p=.095

This is for households in which the income from the project is earned by the male and/or female head of household or by the entire family through a household-level unit. This does not include families where an adolescent son or daughter works on the project but does not pool any of his or her income with the family.

Agricultural Self-Sufficiency

While the traditional form of production in the *seringal* is changing with a decrease in rubber and an increase in wage labor, households and individuals are engaged in other forest-based or community-related productive activities or wage labor. They are not abandoning the traditional; they are reconstructing it. This next section explores the productivity of the slash-and-burn agriculture practiced in the two *seringais* to examine whether or not this productive component is meeting the self-sufficiency goals of the reserve.

In 1991 and 1994, I interviewed the households in this study as to the size of areas planted with annual crops, the harvest yields from these areas, their consumption needs and the percentage of the harvest that they marketed. In both 1991 and 1994, the average household was able to generate surplus production of beans and rice, the two staple crops in the reserve. I arrived at these figures based on the monthly consumption of these items

reported by the household and their reported crop production levels. The average rice surplus production was 318% and 305% of annual consumption needs in 1991 and 1994, respectively. This means that most households had over three times the amount of rice needed for subsistence.

Bean production was less reliable than rice for the families surveyed. Average surplus bean production in 1991 and 1994 was 191% and 130% of consumption needs, respectively. Surpluses averaged 93 kgs per household in 1991 and only 41 kgs per household in 1994, leaving very little of a safety net. The low range of this mean statistic was -240 kgs for both years, indicating that some households experienced a deficit of over 200 kgs of beans in their consumption needs.

There were five families that had no bean production in 1991. In three of these cases, the families had just moved into the area from another *colocação* and were forced to purchase all the agricultural products they normally would have harvested from their own fields. In the fourth case, pests destroyed the household's whole bean crop. In the fifth household, they did not plant beans that year because seed was expensive and hard to find.

For those households who experienced shortfalls in their agricultural production, the extractive reserve community, in the form of neighbors, relatives and CAEX credit accounts provided a safety net. For those households who have not bought into the new social construction within the reserve (i.e. those who have not joined the CAEX or who do not participate in community activities), their safety net is increasingly unreliable. Local traders who have been severely decapitalized by the fall in rubber prices can no longer provide the emergency services that once were one of their most effective means of securing dependency

by rubber tapper households. As CAEX, the union and other branches of the social movement expand their scope of operations to cover more of the reserve, they hope to incorporate such families into the web of the new constructed community within the extractive reserve.

Buying and Selling Labor within the Seringal

None of the male or female heads of household sold their labor to their neighbors or relatives. Nine of the 22 households (41%) that responded indicated that they had hired someone else to work for them, either as a *meeiro* for rubber or Brazil nuts, a daily worker for the agricultural fields, or a maid/babysitter. The remaining 13 households (59%) had not hired anyone to work for them during the previous year. It is interesting that some people responded that they had not hired anyone to work for them over the past year even though they had a *meeiro*. This form of labor organization is not seen as a formal or contractual one because money does not change hands. Rather, the *meeiro*-household relationship is one of exchange between two parties. The *meeiro* exchanges his labor¹⁰ for access to a particular resource, a share of the harvest, and sometimes room and board. *Meeiros* typically take a 50% cut of the rubber or nuts that they gather but this percentage varied in my study from 25% to 60%.

¹⁰ I say "his" labor here and elsewhere because I have never met or heard of a woman working as a *meeiro* during numerous, extended field trips over six years in this area.

Shifts in Labor Allocation

As with other limited-resource households, families in the reserve manage a complex set of activities and must make decisions regarding the allocation of labor and other resources to ensure that their combination of market and consumption production meets the household's needs (Hildebrand 1986). In making such decisions, one of the most important criteria in limited resource systems is the return per unit of labor. This is also an important factor in evaluating returns from non-timber forest products (Clay 1992b) and is the criterion most commonly cited by individuals and households in this study.

In this section, I examine these and other criteria in the decision-making strategies of the surveyed households. I relate their strategies to the two most economically important non-timber forest products, rubber and Brazil nuts, and focus particularly on the gendered participation and implications of the production system.

This section focuses on the interplay between seasonality of traditional extractive practices of rubber and Brazil nuts, the changing market and social values of these products, the impact of the Brazil nut processing project and the process of household decision-making relating to these activities. The complementarity of the rubber-tapping season (May-December) and the Brazil nut harvest (December-March) historically has allowed households in the extractive reserve to exploit these two NTFPs so that, ideally, there is a source of cash income throughout the year. However, with the introduction of the Brazil nut processing project, there is seasonal competition for labor between the project and latex extraction.

The Brazil nut processing season partly overlaps with that of latex extraction. The two proposed technological improvements associated with the Brazil nut project could further

extend the processing season. First, the introduction of drying tables with movable covers could allow the mini-factories and the household units to begin processing earlier in the year. Currently, they have to wait until the rainy season has abated so that there are sufficient, consecutive sunny days to allow pre-drying of the nuts. Drying tables with movable covers could push the start of the processing season back to April. Second, the use of two storage sheds during the Brazil nut harvest would reduce losses due to post-harvest rot. This would leave a larger quantity of nuts to be processed which could extend the processing season beyond October.

As the processing season currently stands, there is some competition with labor that is invested in latex extraction. However, the productivity of the rubber trees declines significantly during the driest months of August and September. Those who can afford to, refrain from tapping rubber at this time of the year, in order to let the trees rest. Thus, there is labor that would be available for Brazil nut processing during these months. The mini-factories are organized such that it would be difficult for idle rubber tappers to secure a position for only two months in the middle of the processing season.

The decision between rubber tapping and working as a wage laborer in the project was one that several people had to make in 1994. As an example of this decision-making process and the criteria involved, I discuss here the case of Raimundo, who is 30 years old, single, and a CAEX member. He is representative of the largest group of people who tap rubber in Cachoeira, a *meeiro*. For the previous two years, Raimundo had been working as a *meeiro*, living with a family and working their rubber trails in exchange for room and board and half of the rubber that he harvested. In August of 1994 he stopped cutting rubber and began work

as a sheller in a mini-factory, taking over the machine of someone who had left the project. During our conversation in September, he estimated that he could have cut 50kg of rubber in August, his half of which would have earned him US\$36.00. His salary from the mini-factory that month was US\$48.02, out of which he paid 10.00 for room and board.

Since August is one of the lowest months of rubber productivity (because it is the peak of the dry season), Raimundo's returns from rubber could be higher in other months. However, since he does not have access to rubber trails of his own and must work as a *meeiro*, the probability of his earning more with latex extraction than with nut shelling is unlikely. Also, his productivity at the Brazil nut project will most likely increase as he becomes more familiar with the work.

Raimundo said that, next year, he would have to see how the price of rubber during the most productive rubber-tapping months (May-July) compared with the price/kg paid at the mini-factory. After the shelling season is over he planned to gather Brazil nuts as a *meeiro*. He hoped to store that harvest of nuts, process them and sell them to the CAEX for a higher price. "I'm not saying that I'll never cut rubber again but I think that for the next two years at least I'll be shelling nuts instead". Income alone was not the only factor that influenced his decision to choose Brazil nut processing over rubber tapping. Work conditions, leisure time, and control over the labor process also were important factors. As Raimundo expressed it:

[t]he Brazil nut work is so much easier--I can sleep more, I work fewer hours per day, I have more leisure time and, I like the work better too. . . . Now, how much I make depends on how hard I want to work. In tapping rubber, how much I make depends on the productivity of the trees.

The family with whom Raimundo lives has experienced some changes due to his shift to the mini-factory. Instead of splitting the rubber production 50/50 with the male head of household, Raimundo now gives a percentage of his Brazil nut income to the female head of household (who also works at the mini-factory) to pay for his room and board. By working for wages at the mini-factory, Raimundo has increased his income, his control over that income, his productivity and his work satisfaction. He also has shifted from a share-worker to a paid lodger.

Raimundo's case is indicative of shifts in access and control over resources and the future of population densities in the reserve. As a single young man, he has no *colocação* of his own. His family does not have the means to divide their *colocação* in order to provide for him. The employment provided by the mini-factory, combined with work as a *meeiro* during the Brazil nut harvest, allows Raimundo to make a living in the reserve. If the project could provide reliable employment over the long-term, it is conceivable that Raimundo and others like him could use this livelihood strategy as the basis for a new form of social organization in the reserves.

As was shown earlier in the discussion of the reserve's clearing regulations, most households are well within the annual limits. The family for whom Raimundo presently works could theoretically enter into a new arrangement with him in which he would be allowed a small area in their *colocação* to build a house and clear a small area for annual crops. Thus, the *colocação* could sustain two households as long as the Brazil nut harvest and the project could maintain adequate returns to Raimundo.

Changing Gender Roles in Household Economies

As was seen in Chapter 2, the male head of household traditionally has been the central, if not the sole, economic actor for the household. In the early days of the rubber boom last century, there were few, if any, women and children in the *seringal*. Later, as the economy shifted from pure extractivism to household-level production, women and children played an important but economically invisible role. Women and adolescents have strengthened their social role in the *seringal* and the rubber tappers' social movement over the past two decades, but the male head of household largely retained economic control. Today, women and adolescents are increasing their economic visibility and decision-making power within the household. A few are pushing to translate this new power into stronger social and political positions within the union and the CAEX (Campbell, forthcoming).

Changes in access to rural benefits programs, wage labor opportunities and the Brazil nut project are largely responsible for this shift. Female agricultural workers are eligible for retirement benefits at the age of 55. In several older families in my study, the female head of household was the primary breadwinner due to her monthly paycheck from the state for these benefits. Older men who served as *soldados de borracha* during World War II are also eligible for monthly pension payments from the federal government. As the extractive reserve residents and their organizations continue to establish projects to improve services and productive activities and push for additional state services, there are increasing opportunities for men, women and young adults in wage labor as teachers, health agents and community organizers. Thus, as household economies diversify, so do the roles of different household member. Shifts in power in decision-making and resource allocation are taking place as

women and adolescents gain access to their own cash income and seek to control part or all of the returns to their labor. This section explores these changing economic roles, largely in light of the Brazil nut project.

For most women in the project, making visible contributions to household income has increased their decision-making power in the household. As the husband of one of these women said, "Women have more of a voice now" due to the project. Women told me that they were satisfied with the project and with their new ability to help with the family's expenses. As one woman said, "Sure, it's more work. But before, we were working all the time anyway and not getting paid for it". Many women noted that they have more independence now because of their new income source. Raimunda declared, "Now I go into town by myself and make my own bargains. Before, the money we earned always went into his pocket first -- now it's in mine."

In households that are indirectly affiliated with the project, the economic roles of teenage girls are also changing. There are families in the project who have hired a neighbor or relative to assume child care/housekeeping duties. These girls are earning their own income and, although they do not earn as much as they might if they were employed by the project, both of them told me that they have no interest in working at the mini-factory. Overall in the decentralized Brazil nut processing mini-factories, household units and home-based shelling arrangements, individuals are gaining increasing control over their own income streams.

Intra-Household Negotiations: Pooling Resources vs. Individual Control

The money made from latex extraction by household members almost always goes into the family's pot of pooled income. There were no cases in my survey of an individual household member keeping the income from rubber for him/herself. For some, employment in the Brazil nut processing offers a chance for a different type of employment, increased autonomy in deciding how to use one's labor and control over one's income. This section is divided into three parts. First, I examine individually controlled income from the mini-factories. Secondly, I explore the dynamics of income control with families operating household-level units. This section concludes with a broader view of gendered economic roles within the households in general and how those roles are changing.

Wage Labor at the Mini-Factories: Individual Incomes

The general tendency is for single persons employed at the mini-factories to keep their income separate from the pooled income of their families. Married persons pool their paychecks with the other sources of income for the household. Those who work as home-based shellers affiliated with one of the mini-factories vary in the control of their income. Roughly half of the female heads of household I interviewed who work under this arrangement said that they pool their income while the other half maintained that they are more autonomous in deciding how to spend their paychecks. The three male heads of household I interviewed all stated that they pool the income but that each person who works on the shelling gets some personal money for their own purchases.

There were three households in this study in which both the male and female heads of household were employed in the mini-factories. In two of these cases, the couple pooled their income and made decisions together regarding spending and major purchases. Both of these households were young couples who hired a relative or neighbor to work for them as a babysitter/housekeeper. Money for the babysitter's pay came mostly from the wife's paycheck while the husband made most of the household's purchases on weekly trips into town. All four reported that they preferred to each keep some of their income separate for personal purchases but that they jointly shared the burden and decision-making responsibilities of major purchases. As one of the husbands said, "Those days of the men controlling all the money are over"

João, the husband of the third couple stated that they also shared their income and decision-making responsibilities but the end result was somewhat different. João signed for and cashed their joint paycheck during his trips to town. (The CAEX accountant writes out one check which contains both of their monthly payments). "The paycheck is made out in my name. I do with it what I want. If she wants to do something special or buy what she wants, I give it to her" (João). His wife Ana said, "It's tough for me to even see the money that I earn at the project."

Aside from these three married women, the only other adult woman employed at the two mini-factories in this study was Celia. Celia came by horseback every day from another part of the *seringal*. She told me that she also pools her income with her husband. Not only is Celia earning her own income, but she has earned a new reputation for herself and for women in general in the reserve. It is unusual for women to travel by themselves in the

seringal. Her daily, solitary trek on horseback has earned her the admiration of quite a few people. The manager of the mini-factory where she works said to me, "She's a brave woman to come all that way by herself."¹¹

Celia's groundbreaking travels within the reserve bring to light another group of people that rarely, if ever, are mentioned in the extractive reserve literature: the physically handicapped. There is a young man who is crippled from the waist down with polio who works as a nut sheller at one of the mini-factories. Celia's sister-in-law, who suffered from a more minor case of polio, is very interested in working with Celia as a sheller. She is unable to walk to the mini-factory (at least an hour's walk at a good pace). However, she plans to accompany Celia on horseback if she is able to secure a position in the mini-factory. The ability of the mini-factories to provide employment for these two individuals is very important, as their only other income options would be to rely on minimal payments from the state rural health fund.

There are few examples of teenage girls or single, young women working at the mini-factories. Those girls who are involved with the project are either part of a household that operates an independent processing unit or they work as a home-based sheller in affiliation with one of the mini-factories. All of the women at the two mini-factories in this study at the time of my 1994 research were female heads of household.

¹¹ While Celia did not want anyone else to know, her niece told me that Celia carries a gun with her because one day she saw two black cats (similar to jaguars) on the trail. Celia stops and hides the gun in the woods just before she arrives at the mini-factory. While travelling the same path alone on foot several days later, I myself, was terrified at a close call with one of the same animals. Celia's new-found reputation for bravery is well-deserved.

There were several cases of teenage girls or young women who worked at one of the mini-factories for a few months in 1993 or early in the 1994 season. According to the managers, most of these women decided that they did not like the work, a fairly common occurrence with both men and women who gave the nut shelling job a trial run to see what it was like.

One of the young women who had worked for several months as a nut sheller was a member of one of the households in my survey. Felicia had stopped working as a sheller shortly before my 1994 research, in order to concentrate on her duties as a health agent. I spoke with her and her parents about her work at the mini-factory. She had used some of her paychecks to buy clothes and other personal items. However most of her income went towards the construction of the family's new sawn timber house with a zinc roof. Although her income came from both the mini-factory and her salary as a health agent, it provides an interesting contrast to the examples of teenage boys of her age and family position that worked on the Brazil nut project. While teenage boys are allowed to keep their income separate to use for their own purchases, most of the income from this young woman was pooled in her household. In fact, Felicia was the major breadwinner for her family in 1994, earning more with her salary than the household brought in with rubber and Brazil nut harvests combined. She exemplifies a new generation of women in the *seringal* in that she has completed four years of school, has held a job for several years as the health agent at the nearby health post and, most unusual of all, she is 21 years old and unmarried. We teased her about the possibility of marrying her boyfriend and bringing him home to the new house that she had helped build, reversing the tradition of a young bride moving into her in-laws' home.

As opposed to the married employees of the mini-factories or the one case of a young adult woman who pool part or all of their income, the single young adult men or teenage boys who are employed at the mini-factories keep their paychecks separate from their families' pooled income. In separate interviews with them and with their parents, both parties made it clear that whichever young man earns money on his own (through wage labor) has the right to decide what to do with it.

Going back to the example of Sebastião (who had one brother who worked tapping rubber and another in the mini-factory) presents an interesting case of household vs. individual controlled income streams. Before construction had even begun on the mini-factory, I interviewed Sebastião's family in 1991 and talked with his parents, Chico and Suely, about employment prospects in the project and their outlook on the future of rubber tapping. Chico said, "We're not going to spend the rest of our lives tapping rubber. When they [the boys] don't want to tap anymore, we'll leave. Or, instead of tapping rubber, they could go the project." When I asked them about how any future income from the project might be distributed, he replied, "The money from tapping rubber---I decide. The money from the project will stay in the hands of the ones that work there." Thus, Sebastião's brother who works at the project keeps his income to spend as he chooses, while his other brother who taps rubber does not realize an individual return to his labor--this is under the control of their father and the household.

Another example is Julio, who is 16 years old and had been tapping rubber on his family's *colocação*. The money that he earned from latex extraction was pooled with the rest of the family's income. Julio had attended school for three years and had stopped studying

before working with the project. He told me, "At first my father didn't want me to work on the [Brazil nut] project. He wanted me to cut rubber." Now, Julio lives with his sister and brother-in-law during the processing season and works as a nut sheller. He keeps all of the income that he earns for his own purchases. Julio confided to me, "I could make more tapping rubber, but I like the Brazil nut work better."¹² Back at home, Julio's father grumbled to me, "Nobody taps rubber around here anymore."

By working on the Brazil nut project, Julio has gained some economic autonomy and control over his own income and labor. However, his family has lost control of Julio's labor and, consequently, the money that Julio used to bring into the household from tapping rubber. In addition, Julio's sister Ana also left home during the processing season to work as a babysitter for her older, married sister. Both Julio and Ana live with this sister during the processing season but neither pay room or board. The money that Ana makes goes into her own pocket. Thus, Julio and Ana's parents lost control of the labor of two teenage children and the income that they might have brought into the house.

Household-level Processing Units: Pooling Income

For the most part, the income from the household-level units is pooled. I interviewed both the male and female heads of household from three of the four families involved in this type of processing about intra-household allocation. In two of these three families, the female

¹² Julio's average monthly income from the Brazil nut shelling was US\$31.07 in 1993 and US\$39.02 in 1994. This is well below the \$46-\$72 range of his co-workers, several of whom said that Julio didn't put a lot of effort into his job. Because he makes so little at the shelling job, it is fairly easy for Julio to say that he could make more money by tapping rubber.

head of household operates the unit with assistance from one or more children. While the children's time is spent mostly on shelling nuts, the female head of household functions in the same capacity as the manager of the mini-factories. In the third household, the male head of household takes on this role and his wife and children share the nut-shelling machines.

This third family presents an interesting comparison to Julio's case. This unit is run by a large family and has four shelling machines, one of which is operated by their sister-in-law who lives nearby and who is paid separately by their father for her share of the unit's production. The rest of the monthly check is pooled with the other income sources that the family has. The boys' mother, Dona Sebastiana, is the local schoolteacher and receives 1 1/2 minimum salaries/month from the state. Different members of the family also tap rubber and raise livestock and annual crops.

This case differs from Julio's in that both the labor and the returns from the labor of these two teenage brothers remain effectively under the control of the family. Whether they are shelling nuts or tapping rubber, the decisions of time allocation and income distribution are taken by the family. Dona Sebastiana and her husband, Francisco, stated that the whole family pools all of their income, including her salary, and together decides on purchases and/or investments. Thus far, they have purchased basic items for the house with the income from the Brazil nut project, but Dona Sebastiana said that the boys are interested in making enough money to be able to join the CAEX. That way, when they marry and set up their own households, they will already be members.

Francisco told me that his family is making more money with their own processing unit than if two or three of them were employed as nut shellers in the mini-factory. The net

income from their unit for the 1994 averaged US\$ 107.60 per month. There are four shelling machines in their unit, the income from three of which goes into the family pot, the fourth machine being operated by Francisco's daughter-in-law. Assuming that she is responsible for roughly 25% of the shelling, I divided the unit's monthly income by four and took out her share. This leaves US\$80.70 per month for the family, or \$26.90 per shelling machine. Compared to the mini-factory, the average monthly income per nut sheller there was US\$36.53. If two or three members of Francisco's family were employed as nut shellers at the mini-factory and were to have similar productivity levels, their income would total between US\$73.06 and US\$109.59 per month. His family's income from the unit falls within this range and is therefore comparable to the mini-factory rates. In addition, income from Francisco's family unit will increase in the coming years as they increase productivity and extend the processing season through improved storage and infrastructure, and hold the Brazil nuts harvested from their own *colocação* for processing (thus receiving a higher price per kilo from CAEX).

New options in employment such as the household-level processing units open up the possibilities for decision-making about one's occupation, age of marriage and post-marital residence for young men and women. One of Francisco and Sebastiana's sons who was recently married lives with his wife on his parent's *colocação* in a small house that he built with his father. This young man's wife works as a nut sheller in the unit while he works tapping rubber and helping his father with the agricultural fields and other jobs. She earns cash for her wage labor and he earns a return of the rubber and crops. The unit has made it

possible for this extended family to increase their *colocação's* capacity to support an additional household without putting further pressure on the resources within.

The two women who operate household-level units tend to control and distribute the income according to the work done by the children and household needs. Graça told me, "I get the check every month and then I buy what I want with it". Ana said that she and her husband tend to divide the responsibility for household purchases on a monthly basis. She said,

One month will be his and the next it's my turn. Sometimes I put some of the Brazil nut money towards our credit account at the store and sometimes I give him most of it if he needs it for something. This month I'm going to give a good part of it to Evandro [her 18 year-old son who works with her] so that he can go to Xapuri and spend some time there over the holiday.

Defining Rights and Responsibilities

These variations in income control and decision-making are indicative of significant shifts in traditional economic gender roles. In those households with income from wage labor or service payments from the state, men, women and adolescents are defining their negotiating positions in terms of resource allocation and economic autonomy. This does not mean, however, that all households have a single utility function to which household members are dedicated and towards which they all pool their resources (Kabeer 1994, Deere 1995, Wolf 1992). Conflictual struggles over resource allocation and income control are indicative of processes of negotiation in which individuals engage. These negotiations extend well beyond the household and encompass relationships with employers and gender roles in society at large (Wolf 1992).

Decisions taken by individuals in the *seringal* must therefore be placed in the broader context of socioeconomic change that takes place within and beyond the household. From Boserup's (1970) key work on the changing economic roles of women to more recent work linking gender roles, natural resource management and development practices (Klabeer 1994; Rocheleau et. al, forthcoming; Shiva 1989), the literature on women in development has shown that gender is a crucial variable in analyzing small-scale production (Deere 1995). As the Brazil nut project expands, as other opportunities for wage labor arise within the reserves, and as the rubber tapper economy continues to diversify via other productive activities and/or shifts in market values of non-timber forest products, the definition and impact of divergent income streams will be even more significant within and beyond rubber tapper households.

Changing gender inequities within the extractive reserves relate not only to economic roles, but also to socio-political rights and responsibilities. Women who are involved in the Brazil nut project plan to join the CAEX so that they can have a voice and vote in the cooperative's general assemblies, thus translating their newfound economic role within the household into a stronger, more public negotiating position (Campbell, forthcoming). However, for most rubber tapper households, the male head of household retains sole rights and responsibilities as the economic and socio-political representative.

This is shown by the responses of surveyed households to my questions regarding economic roles. Families indicated that the male head of household carried out almost all of the buying and selling. Of the 27 households that responded, 20 (74.1%) indicated that the man was in charge of purchasing goods for the household. In 18.5% of the households, both the male and female head of household shared this responsibility. Only two households (7.4%)

indicated that the female head of household was in charge of purchasing. Both of these households were headed by widows. When it came to selling the household's production, the same gender-based division of responsibility was reported. Of the 27 households surveyed, 22 (81.5%) indicated that taking the household's production to market was the job of the male head of household. Only in the cases of the two female-headed households (7.1%) was this task carried out by the female head of household. In three households (11.1%), this task was shared by the husband and wife. I predict that these roles will shift as the production system transforms to encompass more diverse income sources from various individuals within the household.

Another point of negotiation and of redefinition for women and men in small-scale production systems is land rights. Bina Agarwal has argued that women's legal rights and ownership over land is critical in analyses of economic well-being (Agarwal 1994). This section explores the issue of land rights within the extractive reserve with an emphasis on the shifting gender roles in the *seringal*.

Chapter 2 presented the rules and regulations of extractive reserve management and the household's responsibilities in this process. As part of the reserve management, CNS officials reported that the head of household will have to sign the use agreement with IBAMA that confirms the household's acceptance to abide by the rules of the reserve management plan. The draft use plan states that each family shall have only one *colocação* in the reserve and that a *colocação* will consist of at least two rubber trails. From then on, the draft plan refers specifically to the *seringueiro* and not to the family. The *seringueiro* shall be the one responsible for caring for the rubber trails and Brazil nut trees and for monitoring his own and

neighboring *colocações*. It is the *seringueiro* who may request that his *colocação* be transferred or exchanged with another. He is the household member who will be notified by the Commission if there has been an infraction of the rules and it is the *seringueiro* who is prohibited from requesting another *colocação* in the reserve if he has lost his use license due to infractions.

The implications of these rules for household-level decision making and the access and control of individuals to resources in the reserves could serve to further concentrate power in the hands of the male head of household. The male head of household is still considered the primary representative of the household in the socio-political and economic arenas. Assuming that this traditional role will carry over to the implementation of the extractive reserve, the male head of household will most likely be the sole representative for the household in the residents' association and his signature will be on the use agreement between the household and IBAMA. What are the implications of this contract and accompanying resource control for women and children in the extractive reserves? In the case of death of the male head of household, would the household's rights and responsibilities pass to his widow or to one or more of their children? Upon reaching adulthood, will sons be able to sign contractual agreements of their own with IBAMA for part of a *colocação* that they might be given by their parents? As the rules now stand, a family may establish a second dwelling for adult children and their families (as was seen in the case of Francisco and Sebastiana earlier in this chapter). However, the *colocação* cannot be sub-divided.

Specifically related to this study are questions regarding control over productive assets within the *colocação*. For example, two of the four household-level Brazil nut processing

units in operation at the time of this study were operated almost exclusively by the female heads of household. (In the other two households, the whole family was involved in the operation.) In the two former cases, the male head of household holds ultimate legal control over the *colocação*. As the only CAEX member of the household, he also has sole legal rights and responsibilities over the Brazil nut processing unit. The debt incurred by the household to construct the unit is in the name of the male head of household, yet the day-to-day operation of the unit relies solely upon female management and female and/or children's labor. If the male head of household were to decide to sell or transfer the *colocação* and move elsewhere (as occurred with a neighboring family during my study), the female head of household would lose access to the processing unit and the cash income which is earned from it. She would have no legal recourse to claim part ownership of either the land itself or any of the infrastructure in the *colocação*.

As land use rights and responsibilities are defined for the extractive reserves, gender-differentiated access to and control of resources cannot be assumed to be harmoniously defined within the reserves' households. Many of the families that I interviewed indicated that giving the responsibility for monitoring forest clearing and extractive practices to neighboring households in the reserves would not work well. Many people noted that it would create inter-household conflict if one family were to report another for infringement of reserve rules. They also indicated that there was too much misinformation and lack of orientation to allow neighboring households the right and responsibility for such monitoring. What was needed was clear definition of rules, rights, responsibilities and authority for monitoring and enforcement of the communal land use rule.

Perhaps in a similar fashion at the intra-household level, the extractive reserve use plan should consider allocating these specific rights and responsibilities to all adults within the household. If all household members over the age of 18 were required to sign the use agreement, decision-making and land use within the *colocação* would be legally extended to include all those who use the reserve resources on a daily basis. Such strengthening of individual rights and responsibilities within the household and the community would make the reserve association a more representative and egalitarian organization.

Migration

Low mobility of indigenous and *caboclo* producer households and groups has been shown to be important in their adaptive resource knowledge (Moran 1980). Length of residency has many implications for resource management and social organization specifically within the extractive reserves. The longer a household has lived in the same *colocação* or even in the same *seringal*, the more extensive their familiarity with the reserve's resources, the seasonality of production and the availability and productivity of NTFPs for market and domestic use. Such information is invaluable as households and communities, both independently and collectively, define management plans, communal spaces and projects such as agroforestry and post-harvest processing.

The two extractive reserve communities in this study consist of extended families who have maintained long-standing residences over the years. In 1991 and again in 1994, the mean household size was 6.0 persons. The range in household size in 1991 was from 3-10 persons (N=27), while the 1994 range was from 1-9 persons (N=25). The average number of children

of the surveyed households was four. Most households consist of a nuclear family, but it is quite common to have a young niece or nephew or an elderly parent living at home. Another frequent member of the household is a *meeiro* or, literally, one who works for half. These are usually young, single men who live with a family to tap rubber and/or gather Brazil nuts in exchange for housing and a percentage of the income from the harvest.

The average number of years that the households in my survey have lived in the same *colocação* was reported to be 13 years in 1994. This figure ranged from two households who reported having been in their current residence for just two years (families who had moved from a neighboring area in the same *seringal*) to one household that had been in the same location for 46 years.

As households stay in the same forest holding for many years, neighboring families have established long-lasting relationships with each other. These inter-household relations are very important in communal labor exchanges, social events and socio-political mobilization. I asked both the male and female heads of household to identify which family in the *seringal* they had known the longest, and to indicate for how many years they had known that particular family. Many reserve residents responded that they had known their neighbors since birth. The average number of years that the female heads of household had known a nearby family was 25 years and ranged from five to 47 years for the 19 women who responded. For the 23 male heads of household that responded, the average number of years that they had known a family in the area was 29 years. For men, the range was from five to 52 years. As was discussed in Chapter 2, these long-standing relationships between neighboring *colocações* are central to the definition of land boundaries, inter-household

resource access and control and the creation of commonly held resources in the extractive reserves.

Most children marry and leave their parents' home by the age of 18 at the very latest. Young couples may either set up their own home upon marriage or they may live with one of their parents until they have acquired enough resources to establish their own household. When they do move into their own home, young couples tend to stay fairly near their relatives when possible. This proximity is indicated by the responses I received when I asked the male and female heads of household to count the number of their primary relatives that live in the same *seringal*, not including relatives by marriage. Women reported an average of 2.6 primary relatives living in the same area. This number ranged from zero to eleven relatives nearby for the 23 women surveyed. Men reported an average of 3.4 relatives living in the same *seringal*, ranging from zero to twelve for the 23 respondents. Having a large number of relatives nearby can be very helpful when a household runs low on certain foodstuffs or is in need of assistance for labor-intensive activities or health emergencies. Local social organization within the *seringal* also benefits from the extensive web of family ties in the area, although no one can assume that all familial ties are harmonious ones which lend themselves to cooperative social or productive activities.

The number of primary relatives living nearby varies from one *seringal* to another. The influence of these familial ties and those between neighbors can be significant not only in the decision-making processes relating to resource use in the extractive reserves, but it can also determine the success of certain project interventions. The willingness of neighboring and/or related households to contribute labor to communal efforts, such as fish ponds or

communal agroforestry plots, can be quite different from one part of a *seringal* to another. Some households may have cordial and long-standing relations with other community members and may participate in regular work days to repair the school or the soccer field, but may prefer to refrain from communal activities in agriculture or other productive aspects.

In this study, there were three cases of families who had recently moved to a new area within the reserve. These three families constitute 11% of the sample size. Due to the timing of their move, two of these families were unable to plant annual crops. They were forced to thus purchase or borrow sufficient rice, beans and manioc to see them through to their first harvest. Their survival depended on an available surplus and benevolence of their neighbors and relatives.

Rural-to-Urban Migration

Over the three years covered by this research project, there was no household-level rural-to-urban migration. Calling upon longer-term data from my own research in the Floresta *seringal* from 1988 which involved many of the same families as the present study, there was only case of rural-to-urban migration from the area. This particular family had lived in the Floresta area and decided to try their hand at living in Rio Branco. They moved in 1986 and lived in the city for two years. The male head of household did construction work while the female head of household worked as a maid. Both the male and female head of household are illiterate. In 1987, this family returned to the Floresta *seringal* with assistance from the Xapuri union. In 1994 they constructed a new house that they built largely with income from their teenage daughter. Their daughter has completed 4th grade in the Projeto

Seringueiro school which is five minutes from their house. She was employed as a health agent in the health post and had worked as a sheller in the Brazil nut project. Their experience with rural-to-urban migration, and back again, is well-known within the area and is used by community leaders when they speak of the importance of the extractive reserves in maintaining rural livelihoods as opposed to the difficulties encountered by *seringueiro* families who chose to go to the city.

Rural-to-Rural Migration

The only cases of household migration over the course of this study were rural-to-rural. Of the 28 families surveyed, three of them moved from their 1991 residence. All three of these families moved to other rural areas, either to small farms or to another extractive reserve. The families that migrated lived an average of five hours by foot from Xapuri in 1991. In all three cases, the families now live in areas that are closer to urban centers or to easier transportation. In 1991, these three families had school-age children and lived an average of 1.5 hours by foot from the nearest school, compared to an average of .75 hours for the rest of the surveyed families. Of these three families, two expressed intentions of moving to another area during my interview with them in 1991. Their motives for wanting to leave focused on easier access to school, transportation and other services.

The three families that migrated to other rural areas all came from the Floresta seringal in the Chico Mendes reserve, a more remote area than the Cachoeira reserve. None of the families in my sample within the Cachoeira reserve changed residences during this study. Three of the families surveyed in 1994 indicated a desire to move. Of these, two households

would like to move to a *colono* area closer to an urban center and the third would like to obtain a *colocação* in the São Luis do Remanso extractive reserve. These findings concur in part with data gathered in Cachoeira and São Luis do Remanso by Stephan Schwartzman who argues that holdings with better access, such as in these two reserves, are more highly sought after (Schwartzman, 1992, p. 61).

Schwartzman also argues that rubber tappers who live in more isolated areas (such as the Floresta seringal in this study) may be more likely to migrate, in part because they may have lower income levels (1992). My data show that, overall, the comparative income levels between households in Cachoeira and Floresta are not significantly different. This relative comparability is due largely to the presence of the CAEX in both areas which provides transportation and market services to most of the households. Any difference would be due to the variability in the productivity of Brazil nut trees in the two areas (see Table 3.1). However, looking specifically at the three households that migrated between 1991 and 1994, their 1991 household income levels are lower than the average for the rest of the survey sample, which is in accordance with Schwartzman's position.

The first of these three households was a young couple who moved from their 1991 holding to a different *colocação* in order to be closer to her mother. This young woman's mother is the holder of a fairly large *colocação* that currently accomodates four households. The older woman would like to move into town but does not want to sell her land in the reserve. She is awaiting the arrival of one of her sons who will most likely take over the *colocação* for her. The young couple who had moved after our 1991 interview told me in 1994 that they were considering moving again. Their intention was to move to a small farm

outside of the reserve in order to be closer to his brother. In this case, rural-to-rural migration was planned so that households would be closer to primary relatives. One of the primary decision-making factors of the matriarch of this family is that the *colocação* within the reserve is considered too valuable to be sold.

The second family who migrated during my study moved from Floresta in the Chico Mendes reserve to another extractive reserve, São Luis do Remanso. The *colocação* where this household lived in 1991 had little to no Brazil nut production and was over an hour's walk from the nearest school. Although they were fairly close to the city of Xapuri (a two-hour walk), they informed me that they wanted to move to Remanso where they could buy a *colocação* that was closer to a school and that had a better resource base. As with the first case of rural-to-rural migration, this family felt that a *colocação* within an extractive reserve was more valuable than one lying outside of a reserve.

The third case of rural-to-rural migration in my study was a young family who moved from the Floresta *seringal* to a nearby colonization area closer to the city of Xapuri. Their motive for migration was to improve their access to school and markets. There was a fourth household in my study that, in part, followed a similar migration pattern. This particular family decided to move part of their household from the reserve to a *colono* area closer to Xapuri for the same reasons. However, instead of selling or trading their *colocação*, they decided to keep their holding in the reserve. Their oldest son, who was 22 years old, stayed at the *colocação* and continued to tap rubber and raise crops with assistance from visiting family members.

In three of these four cases, the *colocações* in the reserve were either considered too valuable to sell or were traded for a holding in another reserve. There was only one case of a family that sold their *colocação* within the reserve. None of these *colocações* were abandoned: all four were either sold, traded or kept in family hands. During my 1994 visit, all of the *colocações* that had been part of my 1991 sample were occupied by rubber tapping families.

In accordance with Schwartzman's argument and with lengthy conversations with reserve residents, migration patterns in the more remote parts of the Chico Mendes reserve most likely differ somewhat from those found in my sample. My sample area within the reserve extended out from the city of Xapuri to a distance of a two-day walk. Residents reported that areas farther into the reserve were experiencing outmigration as rubber tapper households faced severe economic difficulties. As with several of the farthest outlying households in my survey, these families in the interior of the reserve were caught in a double bind. With the falling price of rubber, low levels of Brazil nut production, and low market value for annual crops, these families had little to sell. As a result, there were fewer *marreteiros* or travelling middlemen from whom they could buy dry goods and sell their production. These *marreteiros* were also caught in a bind because they could not get advances in credit or dry goods from their suppliers. Their lack of cash flow and credit lines, which had kept the *aviamento* system functioning in earlier times, was drying up. In addition, the ability of the CAEX to meet the marketing needs of all of the reserve residents was strained. Only 5% of the Chico Mendes reserve residents sold their production to the CAEX (CNS et. al, 1992). The CAEX planned to increase its services through additional

mule train and boat transportation and the construction of more supply posts. In the meantime, the outmigration from more remote reserve areas is likely to continue.

However, for those households that live in areas served by the CAEX and that have access to schools and health posts, such as those in my sample, the situation is quite different. In 1994, 83% of the 23 households who responded, indicated that they intended to stay in their present *colocação*. There were 3 households (13% of the sample) that indicated an intention to move. All three of these households intended to stay in the rural area. Two of these expressed a desire to move to small farms closer to urban areas. The third family currently lives just outside the Chico Mendes reserve boundary. They expressed a desire to move to the São Luís do Remanso reserve. They stated that their desire to move had less to do with land tenure security and more to do with their need to find a productive *colocação*.

In sum, over the course of my study, there were no cases of actual or intended migration to urban areas. All of the households that moved, or that expressed an intention to migrate, were cases of rural-to-rural migration. Of the households that migrated over the course of my study, their holdings were occupied by other rubber tapper households, such that there was no net outmigration of households from the extractive reserve areas in my sample. Further research is needed, especially in the more remote areas of the reserves. Migration issues that will most likely become of more importance are the outmigration of young adults seeking employment and/or their own land holdings. There were two such cases in my sample and reports of similar instances in neighboring areas of young men who moved to a more centrally located *colocação* in order to work tapping rubber as a *meeiro*, to work in a

Brazil nut mini-factory or to move into the city of Xapuri to seek employment. If the yields from tapping rubber as it is currently practiced remain low, there may be an increase in these cases of outmigration, especially in areas where there are no other employment options either from the mini-factories, schools or health posts or in areas where a *colocação* cannot sustain another household.

Perceptions of Household Economic Well-Being

At a seminar held in Rio Branco in 1993 on environment and development in Acre, the president of the CAEX stated that households belonging to the cooperative had a more secure economic situation than non-members (CNS et al. 1993). My own data from 1991 and 1994 support that argument and go even further to examine the relative economic conditions of households involved in the Brazil nut project as compared to CAEX members in general and non-CAEX member households. In this section, I present a comparison of the households' perceptions of their economic conditions between 1991 and 1994. This comparison examines differences between households based on their participation in the CAEX and/or the Brazil nut project. For those households who are involved in some aspect of the Brazil nut project, I also examine these indicators in 1991 compared to 1994 in order to see the impact of the project on the household economy. The results indicate that the income levels of those households in the Brazil nut project are higher than those of CAEX member households and of non-CAEX members.¹³ Also, general perceptions of economic

¹³ With one exception, all of the households in which the male and/or female head of household worked in the Brazil nut project were CAEX member households. The one household that was not a CAEX member was in the process of joining and had only to

well-being were stronger in the Brazil nut project households than in the other two groups. This section also explores changes in investment/savings strategies and the amount of debt of the surveyed households.

In 1991 and 1994, I asked the households in my survey whether or not the money that comes into the house every month covers normal costs. Table 4.4 presents the different responses in 1994 according to the household's relationship to the Brazil nut project and the CAEX. Those households which belonged to the CAEX in 1991 or 1994 gave somewhat more positive answers. CAEX members were 10% more likely to report that their income met basic needs than non-members were. Over both years (1991 and 1994) and both groups (CAEX members and non-members), those who expressed the greatest difficulty in meeting basic needs were households which were not CAEX members in 1994. That year, 71% of these families (five out of seven) reported that their income did not cover costs, up from 46% (five out of eleven households) in 1991.

Those families with the male and/or female head of household employed by the Brazil nut project indicated that their general economic situation was more positive than those not in the project and than CAEX members. Of the seven households in the project (exclusive of cases with only an adolescent son or daughter employed in the project), 43% reported that monthly income in 1994 usually covered basic costs. Only 13% of CAEX households and 17% of non-CAEX households gave this response. Households which indicated that income did not cover needs comprised only 29% of Brazil nut project participants, 87% of households belonging to the CAEX and 83% of non-CAEX households.

complete some paperwork before their membership was effective.

Table 4.4 Comparison of Household Economies (1994)

HH Status	% of HH with debt	Debt avg. and range (US\$)	% with no income after expenses	% who have to buy on credit	% who can cover monthly expenses
Project (N=9)	29	\$10.00 (10.00)	29	25	43
CAEX (N=8)	63	\$23.00 (5.0-40)	63	71	13
Non-CAEX (N=7)	83	\$51.00 (25-90)	86	60	17

Source: field interviews by the author

Debt and Credit

The two households in my survey who have invested in a household-level Brazil nut processing unit each owe the CAEX approximately US \$700 for these units. However, these loans were not considered to be a debt, *per se*. Similarly, there were twelve households in my 1994 sample who reported that they had never had to borrow money from anyone. Of these twelve, nine households, or 75%, reported having an outstanding debt. The debts that these households had incurred were all monthly credit accounts with the CAEX, a local merchant or a trader. For these households (plus the other two households which owe the CAEX for their Brazil nut unit), buying on credit or receiving other goods and services up front to be paid back at a later date do not mean that they have a debt. Yet, other households

considered their monthly credit accounts as a debt owed. Individuals who had borrowed cash from a neighbor or relative also called such as transaction a debt.

Perhaps for many people in the *seringal*, the concept of being in debt harkens back to the days when households were beholden to the boss. In these times, the boss would advance goods or services on credit but the difference was that part of the household's labor was committed to him for debt repayment, i.e. through tapping rubber and using that to pay the debt. Rubber was not a commodity that could be exchanged on the market for cash. It served only as an exchangeable good in a system in which cash did not change hands. For the rubber tapper, there was no option as to how one would go about removing the outstanding balance: one had to tap rubber and deliver this to the patron. The condition of being "in debt" meant being beholden to another in such a way that it was "out of one's control". Even if one were to put extra labor into latex extraction and reduce consumption, the possibilities of paying off the outstanding account were slim.

Today, a household that has an outstanding account for similar goods and services does not conceive of this condition as "being in debt" because they are free to use their labor and other resources as they best see fit to pay off the balance. For example, one man told me that he owed the CAEX US\$30. Since he is too ill to tap rubber and his *colocação* has no marketable Brazil nut production, he and his family planned to pay this debt off by making manioc flour and either selling it to the CAEX or to another buyer. Although somewhat limited due to health conditions and the quality of the primary resources available, this household does have a range of production and commoditization options.

Such autonomy in deciding how and when to use available means of production differs dramatically from the times when the boss determined which products could serve as exchange and how labor was used to produce such products. Today, not only has the power of the boss declined (and disappeared in some areas) but the value of rubber has also fallen to such a low point that households do not see latex extraction as the exclusive or optimal use of their resources when deciding between production strategies.

It is interesting to note that households in the Brazil nut project do not use their additional income from the project to purchase monthly dry goods with cash. They continue to use their monthly credit allotment with the CAEX stores because there is no advantage to paying in cash. They are allowed to make purchases on credit up to 50% of their initial quota payment. This "debt" remains manageable because of the credit limit.

Women who earn cash income from the Brazil nut project now see debt as a form of liberation or autonomy from traditional or patriarchal household economic organization. Lucia told me, "Now I can go into town and open an account in my name. The owners know me and they know that I have my income so I can buy what I want." Prior to the project and the cash income that it provides, she and other women were reliant on their husband's accounts in local stores. Now they are defining their own economic identity beyond the household due to their new roles as wage laborers in the project.

Investment and Savings

Autonomy in decision-making among various economic options is also evident when examining the savings and investment perspectives of the surveyed households. From the

days when rubber tappers (and later rubber tapper households) had little or no chance of ever wiping out the balance on the boss' book in order to turn a profit, today's households in the *seringais* in this study have different options to choose from and access to various sources of information. In addition, the extractive reserve provides a new context in which to make decisions. As will be seen in this section, the option of autonomous, household-level processing of Brazil nuts and the rules affecting pasture formation in the extractive reserve have shifted households' perceptions about investments and savings.

There are differing opinions on whether a savings account or livestock yields better returns, but these data show that the bank is preferred by more households. As one man who has five head of cattle and a bank account told me, "Instead of cattle, putting money in the bank these days isn't such a bad idea". Although this specific question was not part of my questionnaire in 1991, I would venture to guess that most households were putting their earnings into livestock at that time because of the inflation rates. Many people still think that livestock or land is a better investment than a bank account. In our 1994 interview, one man calculated that a two-year old calf weighing 100 kg cost approximately US \$110. After 4-5 years and investments of annual vaccines, salt and pasture, it could be sold for roughly US \$320. "This pays better than the bank. Even people in the bank say not to put your money in the bank. They say to put it into animals or property." The problem for many extractive reserve residents, as we saw earlier, is that one must already have pasture in order to raise additional livestock because of the limits on forest clearing.

Ten of the 20 households (50%) currently have an account in the bank; nine households (45%) have never had a bank account; and one household (5%) used to have an

account but has since closed it. When I asked whether or not they invest their cash income, the households responded as shown in Table 4.5.

Summing up the responses, 78% of those surveyed put at least part of their earnings in the bank, in livestock or in both. It is interesting to note that 50% of the households put at least part of their income in the bank, compared to 39% who put all or part of their earnings into livestock. Of the 18 total responses, 14 households indicating making some type of investment in 1994.

Table 4.5 Comparative Indicators of Economic Well-Being in 1994

Reported Investments made in 1994	Survey Sample Totals		Households in the Brazil Nut Project		CAEX member households		non-CAEX member households	
	%	N	%	N	%	N	%	N
Livestock	28%	5	71%	5	---	---	---	---
Livestock and bank account	11%	2	---	---	29%	2	---	---
Bank account	39%	7	---	---	71%	5	50%	2
Do not invest	22%	4	29%	2	---	---	50%	2
TOTAL	100%	18	100%	7	100%	7	100%	4

Source: Field interviews by the author

Conclusions

Households and individuals in this study are in a process of economic transformation as they shift their production activities and their relationship with the state. These shifts include a significant decrease in traditional extractive practices, an increase in wage labor, growing reliance on state service payments and the emergence of cottage industries based on non-timber forest products. However, agricultural production for consumption and surplus marketing needs remains steady in spite of changes in other productive activities and income sources.

This chapter presented several interwoven trends, the continued emergence of which may be borne out by future research. These trends include the decline of rubber tapping, outmigration, demands for state services and social differentiation within the reserves. The rubber tappers' representative organizations are lobbying for national policy changes which would favor the extraction and industrialization of latex from the Amazon region. However, the extraction of latex, as practiced by those in this study, yields returns that are increasingly unattractive. If the price paid to the producer for rubber does not increase, the trend indicated by this study is that only those households and individuals with no other production options will continue to tap rubber.

Linked to this trend is the outmigration of young adults from the reserves in search of employment or better services. The Brazil nut project provides some employment and other activities geared to post-harvest processing of other non-timber forest products should also increase income and employment opportunities in the reserve. However, with the decrease in rubber tapping, single young men without a *colocação* of their own may

increasingly turn to nearby colonization or urban areas. Together with the search for employment, families and individuals seek increased state services such as health, education and transportation in these areas. Although the rubber tappers' movement has been successful in establishing schools and health posts (Campbell 1990), the movement and the state face an immense challenge in providing these services and marketing assistance throughout the reserves. In this study, the three cases of household outmigration from the reserve were related in part to a desire for better transportation and access to services.

The opportunities for wage labor provided by the Brazil nut project and the state, combined with state service payments and the improved marketing options available through the CAEX have resulted in significant increases in income for some households in this study. Those households that are members of the CAEX and who are involved in the Brazil nut project showed higher income levels than those who only participate in CAEX. The households with the lowest income levels were those who are not members of the CAEX and who rely on the more traditional marketing channels and production activities. More remote areas that lie more than two days' walk from the city of Xapuri are reported to experience an outmigration of such households. Time will tell if the CAEX, the residents' association and the state will be able to amplify the socioeconomic transformations that are taking place in the areas of the reserve covered by this study in order to provide these necessary services. Other institutional challenges for the reserves are discussed in the final chapter.

CHAPTER 5 CONCLUSIONS

My findings demonstrate that the post-harvest processing of NTFPs, as organized in the project presented here, generates equitable employment, strengthens community organization through participation in cooperatives or unions, and provides new social and economic spaces for previously disenfranchised groups without placing additional pressure on the natural resource base. In this concluding chapter, I relate my findings within five areas of inquiry: (1) solidarity in the reserves and the institutionalization of the rubber tapper movement; (2) transformation of household economies; (3) the changing social identity of extractive producers; (4) post-harvest processing of NTFPs as a production practice; and, (5) reflections on the viability of the extractive reserves.

Solidarity and Institutionalization of the Reserves

This study has shown that the rubber tappers in my survey areas are in a transitional period as full implementation of the extractive reserve model takes place. For many households in this study, the extractive reserve and the decentralized Brazil nut project offer opportunities for investment in community or household-level enterprises or wage labor income. These opportunities allow households and individuals to test for themselves the

positive and negative aspects of the extractive reserves. Some households have chosen to invest in the Brazil nut project and the extractive reserve as a means to secure their livelihood over the long term. Some individuals may use the project for cash income while weighing other options, including rural-to-urban migration or establishment of their own *colocação* in the reserve. Nevertheless, as shown in Chapter 3, these investments carry a certain amount of risk, including increased debt to the CAEX and challenges in the market from Bolivian facilities. However, the opportunity costs, as weighed by the households and individuals in this study, show that investment in the reserves and new processing technologies is often considered to be a better option than outmigration or continued reliance on traditional activities such as latex extraction.

A key component in this transitional process of implementing the reserves is the continued emergence of community or inter-household solidarity. Although there is uncertainty among residents regarding the definition of the extractive reserves and monitoring resource use as shown in Chapter 2, I would argue that the historical experience of the two extractive reserves in this study is inculcated within a particular cultural setting which lends itself to superseding such educational and organizational challenges. Their shared history of the struggle to gain the extractive reserves should not be discounted when evaluating the potential for putting the reserves into practice. My own earlier comparative research has shown that there is a significant difference in the levels of investment and experimentation by communities that have struggled together to achieve the reserves, such as the two in this study, versus those in which the reserve was awarded by the state without a demonstration of commitment or unionization by communities in the area (Campbell 1990).

Rick Fantasia argues that collective action by unionized workers achieves its highest potential when it is free from constraining institutional structures. He notes that

cultures of solidarity are more or less bounded groupings that may or may not develop a clear organizational identity and structure, but represent the active expression of worker solidarity within an industrial system and a society hostile to it. They are neither ideas of solidarity in the abstract nor bureaucratic trade union activity, but cultural formations that arise in conflict, creating and sustaining solidarity in opposition to the dominant structure (1988, p.19).

Although the case of the rubber tappers differs significantly in the degree of industrialization, there are some parallels that can be drawn from Fantasia's insight. In the case of the rubber tappers, their most effective means of demonstration was the *empate*, an innovative and spontaneous form of civil protest. The *empates* were an effective expression of the rubber tappers' culture of solidarity. These demonstrations went beyond the standard state unionization or agricultural federation strategies, which advocated negotiations with landowners, involved a certain degree of co-optation, and at times resulted in the rubber tappers' removal from the forest to a smaller lot which was incompatible with their traditional productive activities.¹

Keith Bakx notes that the Xapuri union took a hard line with such institutional alliances and remained steadfast in its refusal to accede to unfavorable negotiations (Bakx 1986). Today, this shared history of struggle in which the Xapuri rubber tappers used their institutions to their advantage bodes well for the challenges which face the movement as it continues to make a transition from *empate* demonstrations to unionization and currently to

¹ See Bakx (1986, p. 252-263) for a discussion of the role of Brazil's agricultural federation (CONTAG) and the Catholic church in channelling the rubber tappers' resistance to the cattle ranchers towards legal, institutional mechanisms that partly undermined the spontaneity and effectiveness of their resistance.

cooperative production and marketing within a common property regime which involves a qualitatively different relationship with the state. Whereas the union office was once the center of activity for rubber tappers in the city of Xapuri, the sidewalk in front of the CAEX office is now the preferred gathering place. While the *empates* were, and continue to be, an effective, temporal response to the challenges of expulsion and land rights, the movement has established a more permanent and collaborative institutional response in the form of the CAEX.

Through the rubber tappers' struggle to gain extractive reserves, part of their agenda coincided with that of environmental allies. In some cases, these socio-political alliances have garnered new economic relationships as donors saw the extractive reserve model and the marketing of non-timber forest products as a means to conserve natural resources and promote sustainable development. As a result, funds for projects such as a Brazil nut processing factory were provided to the CAEX. Although the CAEX was established in 1988 without any external funding, financial assistance by NGOs has been crucial to the continued operations of the CAEX. As a grassroots cooperative, the CAEX has always had an urgent need for training in basic accounting and managerial skills, a need that has not received adequate attention from donor organizations. These needs are being addressed through ongoing efforts, but the lack of business training is reflected in the attitudes of reserve residents towards the CAEX and its management of the Brazil nut project.

The future of the reserves will depend in large part on the ability of the associations of extractive reserve residents to actively engage and invest in the movements' institutions. The institutional growth of the rubber tappers' movement, from the formation of base

communities of the Catholic church to the union, the CAEX and today's newer extractive reserve associations has been, and continues to be, faced by severe challenges. Earlier in this study, I presented the difficulties of the CAEX in meeting the needs of a physically dispersed population in the reserves. Another challenge lies in the ideological transition of its members and their willingness to embrace their role as stakeholders of the CAEX. Similar challenges face the movement and the reserve-wide resident associations. Resource management and monitoring activities will be successful only if those living in the reserves continue to dedicate themselves to the concept and practice of the reserves. This requires intensive and sustained communication, education and cooperation among reserve residents and the movement's institutions. It was this type of effort which created the reserves in the first place. Increased collaboration with research and extension organization and donors should only serve to strengthen these efforts. The movement's changing relationship with the state in terms of securing services for the reserve, facilitating transportation and marketing and gaining political power through the election of movement leaders to municipal, state and federal positions will also be of crucial importance in the successful implementation of the reserves.

Transforming Household Economies

During the rubber boom of the last century, tappers in Acre were dependent on commodity production via capitalist relations which involved economic and non-economic forms of control over their labor in a system of merchant or circulation capital. Following the rubber boom, rubber tapper households diversified their activities to include commodity and subsistence production. Due to the reduced yet still prevalent role of bosses or traders,

these producers were not free to sell their labor or their commodities on the open market (Bakx 1986; 1988).

David Goodman and Michael Redclift note that generalized commodity production is a necessary step in the transition towards capitalism (1982). This requires that both labor power and the means of production circulate freely in the market. While the labor of rubber tapper households can and does circulate in the market to a certain degree, the form of land tenure, state relations and the form of production make that labor physically remote from capitalist labor markets. The means of production, in this case forest resources and the technology to transform those resources, is a circulating commodity but its circulation is restricted by the state. Land within an extractive reserve is not freely available on the market as a commodity. The means of using the resources within the reserve is determined not by the market, but rather by the state in conjunction with the residents' association. Thus, the means of production cannot be acquired by the capitalist in the market.²

This study has shown that the *seringal* today is the site of multiple production strategies which combine wage labor, commodity production and subsistence agriculture and extractivism. The Brazil nut project represents an emerging cottage industry and family-based enterprise that involves commodity production within a capitalist system but without the formation of capitalist relations. Most wage labor in my study consists of seasonal, piece-rate

² Although it would be theoretically possible for a rubber tapper household to purchase a *colocação* within an extractive reserve and hire others to work for them in the permitted productive activities, such an occurrence would be against the spirit and the law of the extractive reserve. As presented in Chapter 2, the extractive reserves were created to permit residents to continue to live in the area and practice non-degradatory extractivism and other activities in line with their traditional production system.

work for the CAEX in the Brazil nut project. Due to the organization of the household-level Brazil nut processing units, families who have invested in these enterprises rely solely on household labor. Others involved in full or part-time wage employment work for the CAEX or for the state. None of the male or female heads of household in my study work for other households in the reserve. All of the households have retained control over their land and other means of production through their investment in the extractive reserves. Thus, while there are individuals and households which rely increasingly on wage labor and households are becoming the site of multiple class relations (Deere 1990), a fully proletarianized class of wage laborers has not emerged.

Households in this study have invested in household and community-level enterprises and have transformed their traditional, extractive economy into one which combines subsistence and market production with some wage labor. Through twenty years of social, political and economic mobilization, they have secured access to and control over their traditional forest resources. The households and individuals in this study have thus been able to transform a traditional economy based on exploitative, patron-client relationships into a cooperative marketing system based on autonomous household production. Those who have taken part in this transformation, by joining the CAEX and/or practicing some wage labor, have higher income levels than those who are tied to more traditional relationships and economic practices. Perhaps what was not foreseen in the reserve proposal was an increasing participation in wage labor and a decreasing participation in one of the area's traditional extractive practices--latex extraction. Although these two outcomes may be unanticipated, they do not negate the viability of the extractive reserve model.

Changing Social Identities

The extraction of latex has been the primary economic activity of the areas in this study for over a century. Rubber trails defined boundaries between land holdings throughout the rubber boom and still do so today. Those who tapped rubber during World War II gained prestige and economic support through pensions earned as *soldados da borracha*.

Today, rubber no longer holds such social and economic importance in the areas in this study. The economic value of rubber has declined dramatically. Many households in this study no longer engage in the extraction of latex as a livelihood strategy. They calculate that the returns from rubber tapping are too low to warrant investment of their labor. Socially, some residents of the extractive reserve declared that tapping rubber was no longer a culturally valuable activity. Many referred to those who still tap rubber for their economic survival in terms of pity, "*coitado do seringueiro*". The isolation and physical duress of tapping rubber was compared to the easier and more sociable work required of other economic activities, such as working as a nut sheller in a mini-factory.

Rubber trails have been the standard measure of land control and as a definer of social space. As Brazil nuts gain in importance as an economically valuable NTFP compared to rubber, will the *colocação* of the future be defined not by how many rubber trails it has, but by how many Brazil nut trees that it has? Whereas the rubber trails have traditionally been considered to be the domain of men, it is possible that shifting gender spaces in the forest could result from shifts in the economic and cultural importance of other forest resources.

As groups such as the rubber tappers move 'from protest to production' (Bray 1991), women are seeking to move beyond traditional economic, political and social roles. It is

important to note, that in a production system where women traditionally have little or no access to the market or to an independent income stream, they are now in control of their own credit accounts with local merchants. They also are managing household enterprises or are engaged in wage labor such that they have become the primary breadwinners for their families. I argue that these women are beginning to exploit the transformative potential of the social movement into longer lasting changes for themselves, their families and their communities. As Safa has observed generally for women's social movements in Latin America, I argue that women in the extractive reserves also are invested in a long-term process of social change (Safa 1995). Time will tell if they are successful.

Increased Production through NTFP Post-Harvesting

Only a few of the households in my study have ever planted Brazil nut seedlings. An agroforestry project designed to test and promote cultivation and management of Brazil nuts as an accompaniment to the decentralized processing proved to be unsuccessful. As in the days of the rubber boom, there is little to no investment being made in securing or improving the quantity and/or quality of the primary resource for the Brazil nut project. The households in this study area can be certain of guaranteed access to current and future native stands of Brazil nuts because of their secure land tenure in the extractive reserves. However, they cannot be at all certain of their access to markets over the longer term.

The decentralized processing project provides much more favorable economies of scale and advantages in value-added and decreased transportation and labor costs for CAEX. Other potential market advantages for CAEX could exist in an international alliance of agro-

extractive associations, ATEA, that has been formed among producer groups in Peru, Bolivia and Brazil. The formation of a basin-wide cooperative for extractive reserve products has also been suggested (Schwartzman 1994). Yet, CAEX already faces severe competition from completely mechanized Bolivian Brazil nut factories (Anderson 1996). Existing plantations in Brazil and elsewhere have not yet reported any economically successful harvests (Mori 1992), but competition from plantation production is bound to occur according to the cycle of extracted products posited by Homma (1992, 1993). Over time, the market share and competitiveness of Xapuri's extractive reserve residents could very well decrease.

There are two counter arguments to these predictions which bode well for the Xapuri Brazil nut project. While these economic models and arguments hold true for a few key extracted forest products such as rubber and cacao, Schwartzman argues that the particular market performance and potential of various NTFPs must be considered. Prices for certain NTFPs vary considerably over time and present both great risks and great opportunities for producers. Each product behaves uniquely in the market and should be studied intensively in order to maximize their potential and minimize risk for producers (Schwartzman 1994).

Also, complete reliance upon Brazil nuts and other NTFPs is not a sound livelihood strategy. "From a strictly economic perspective, then, harvesting of non-timber forest products is a most precarious foundation for a major development strategy" (Anderson 1992, p. 69). However, very few rural populations rely solely on extractive practices. Their livelihood strategies combine subsistence and market production with cultivated and extracted products (Anderson 1992), as witnessed by the households in this study.

Challenges for the Extractive Reserves

Whitesell aptly notes the lack of recognition of rubber tapper organizations and understanding of the extractive reserve concept on the part of extractive producers as a severe impediment to the formation of effective reserves (Whitesell 1993). Residents are expected to be the first line of sound resource managers and monitors in the reserves. It is difficult for them to carry out these roles if there are misconceptions about rights and responsibilities. It is impossible to do so if there is misunderstanding, or even no understanding, of what the extractive reserve is.

Although it was not part of my formal survey, I did ask roughly half the sample families in 1994 what they understood the extractive reserve to be. Of the nine responses, 66% indicated that the reserve was a protected area for rubber tappers while the remaining 33% did not know what was meant by the term "extractive reserve." Sebastião, a former *soldado da borracha* who had lived in his *colocação* for over forty years and who was a long-standing union member told me that he had attended a meeting with 30 neighbors during the previous year to discuss the extractive reserve.

At this meeting a union leader talked about the reserve. The leader had lived in the area for years and was well known by all those present. The meeting was held in an area where the very first health post and one of the first schools was built and where almost all of the residents are union and/or CAEX members. Thus, conditions were seemingly ideal for discussing the extractive reserve model. However, Sebastião told me, "He [the union representative] explained everything but I didn't get any of it. He went through it two times and then he asked if anyone understood. Everyone said that they didn't understand."

One cannot assume that everyone who lives in a *seringal* which has been declared an extractive reserve inherently understands the concept of the reserve, the process by which they are to define and enforce regulations and the various organizations involved in reserve management. Such an assumption is just as erroneous as arguing that local resource managers such as rubber tappers are natural conservationists who do not practice degradatory extraction because they reside in and rely upon forest resources (Alcorn 1994). From my conversations over the years with reserve residents, it also is erroneous to assume that information presented at a meeting makes its way back home to other household members and resource users. The organizational challenges are daunting for effectively communicating and working with reserve residents. This points out the need for the union and the CNS to think creatively about outreach programs for reserve residents to learn about the concept and detailed management of the extractive reserve. Yet, as witnessed by the victories gained through the unionization movement of the 1970s and 1980s, there is strong potential.

In tandem with the organizational challenges of implementing the extractive reserves, it must be kept in mind that the extraction and post-harvest processing of NTFPs as presented in this study is a management practice embedded within a broader array of productive practices and a network of social, economic and political organization. NTFPs are not intended to be a development alternative; they are one tactic by which some producers may be able to modify their productive system as part of a more complex household or community-level strategy. It is clear that effective, long-term attention to structural necessities such as roads, markets, and health and education services, by state and non-governmental providers must accompany any such technical practices, be they non-timber

forest products or improved yield varieties. This will require a higher level of cooperation between the state and civil society to bring about larger development strategies (de Janvry and Sadoulet 1993).

Victoria Lockwood noted that, "as capitalism promotes structural changes in rural communities, one cannot avoid reflecting on whether the situation of those communities has improved or deteriorated as a result. The answers are never black and white" (1993, p.212). The answers can never be black and white because a simple dichotomy of producers does not exist on which such reflections can be based. Within the Amazon populations referred to generally as peasant producers or *caboclos*, there exists a multiplicity of agro-extractive production strategies (Smith et al. 1995), a continuum of resource management knowledge (Browder 1995b), and culturally distinct social groups (Nugent 1993).

This study has shown that, even within the relatively small geographical areas of my study, there are important differences on all of these accounts which determine the cultural, economic and political lives of extractive reserve residents. In the over 3 million hectares of Amazon forest that lie within extractive reserves, these multiple forms of acting and knowing certainly are even more varied than those found in a corner of the basin in Acre. The flexibility and ingenuity of extractive reserve residents, their representative organizations, technical agencies, state officials and donors in collaborative constructions and transformations is necessary to achieve the goal of the extractive reserve model which is "to overcome traditional extractivism and maintain the relational components of nature-society in an integrated form" (CNS et al. 1993, p. 11). Through effective socio-political organization, extractive reserve residents in this study exemplify how limited-resource

households can achieve autonomous production systems which combine wage labor and subsistence activities within a capitalized market system.

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BIOGRAPHICAL SKETCH

Constance Elaine Campbell was born in Endicott, New York. She was raised in upstate New York and northern Virginia, where she attended Oakton High School. She received her undergraduate degree in 1984 at Virginia Tech in Blacksburg, where she double majored in biology and Spanish. Following a semester abroad in Madrid, she began work at World Wildlife Fund in Washington, D.C. In 1987, Ms. Campbell began graduate studies at the University of Florida. Her master's program included a study abroad program in Rio de Janeiro and field research in Acre, Brazil. She received her Master of Arts degree in Latin American Studies in 1990. Upon completion of her doctoral degree, she will move to Acre with her husband, Eduardo Romero, to begin an extended tour of research and training with UF's ongoing agroforestry project.

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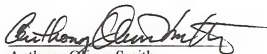
Marianne Schmink, Chair
Professor of Anthropology

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Helen I. Safa
Professor of Anthropology

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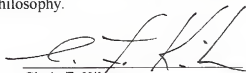
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A handwritten signature in dark ink, appearing to read 'C. F. Kiker', written over a horizontal line.

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This dissertation was submitted to the Graduate Faculty of the Department of Anthropology in the College of Liberal Arts and Sciences and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December 1996

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